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Birds and All Nature

IN NATURAL COLORS

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A GUIDE IN THE STUDY OF NATURE

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TWO VOLUMES A YEAR

VOLUME VI.

JUNE, 1899, TO DECEMBER, 1899

EDITED BY C. C. MARBLE

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BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. VI. JUNE, 1899. No. 1

MY NEIGHBOR IN THE APPLE TREE.

NELLY HART WOODWORTH.

TROPICAL portions of the American continent, rich in an endless variety and beauty of bird-life, have shared with New England but a single species of Trochilidæ, *Trochilus colubris*, the ruby-throated humming bird.

This "glittering fragment of a rainbow" adds a decorative feature to our gardens, its nest so protected through diminutive size and perfect adaptation to the surroundings that it rarely comes under one's observation.

It is commonly asserted that the male is an arrant shirk, that he leaves the entire labor of building and furnishing the house as well as the heavy duties of housekeeping to the faithful mother, being in the fullest sense a *silent* partner either from choice or otherwise, a mere apology for a husband and head of a family.

Nor does he redeem himself when the prospective "twins" arrive and slender bills are lifted appealingly for food! No thanks to him that the naked, squirming little atoms replacing the two white eggs become gradually stronger, that some hint of plumage duly covers their nudeness, or that bye-and-bye they become birds in reality.

Two years ago this "little lady in green" made her nest upon an apple tree branch, concealing it so deftly that the gardner at work near by was unaware of the distinguished guests until the brooding was nearly over. When the little birds had flown the lichened residence, becoming a family possession, was considered the daintiest souvenir of the summer.

Being anxious to know if this rare, interesting episode would be repeated, the following summer I watched carefully for its repetition. Promptly in June I found that a humming bird was again "at home," this time upon a horizontal maple branch, twelve feet from the ground and directly over the sidewalk. This nest was soldered upon a long slender bough half an inch in thickness at the intersection of another, a mere twig a quarter of an inch through, the latter inwrought with, and concealed for a full inch in the structural fiber. Upon the 22d of the same month, by the aid of a ladder I found that two eggs "the size of yellow beans" were lying inside the downy cup shaped nest. Before this luckless visitation the tail of the brooding bird could be seen from the ground, but during the next two days there was no sign of life thereabout.

In the afternoon of the third day my bird was in the maple, darting hither and thither like a swallow, plunging into the insect swarms and securing several before they realized her presence. Then she came to the honeysuckle beside me, hovering over it in a bewildered, irresolute manner as if debating whether she could safely probe its scarlet cups. Just at this moment a big miller flew by and off she went in close chase, capturing it upon the wing. Then she rested upon a maple twig, leisurely preened her feathers,

drawing each one gently through her beak, and after a second visit to the honeysuckles darted toward the nest. Now, I thought, is the time, if ever, to decide if she is still housekeeping, and following quickly, I saw her standing upon the edge of the silken cradle. Her head moved rapidly from side to side as she regarded its contents, after which she rose lightly in the air, dropped upon the nest with the airy grace of a thistledown, and spread above it the feathered blanket of her soft, warm breast. For several minutes she ignored my presence, drawing her beak across the leaves or springing into the air for a passing insect which was captured and apparently given to her family. Once I detected a "squeak," and her head was instantly thrown to one side in a listening attitude. If it was the note of the mate he did not approach the nest, the thick leaves hiding the tree-top from which the sound proceeded.

There was a furious wind that night and the warm days were followed by a sudden fall in temperature.

From that time the nest was deserted; I could only conjecture that I had presumed too much upon her defenselessness, or, that the young, if young there were, were dislodged by the wind. This abandoned homestead was as round and perfect as a new coin just issued from nature's mint, a marvel of elegance in which all the instinctive gifts of decorative art united.

There were no visible signs of rebuilding during the twelve days that followed; casual trips to the honeysuckle, hovering over the flowers like some gorgeous insect with colors scintillating in the full sunshine, alone gave evidence of further interest or intention.

Upon the thirteenth day there was a marked change. Again she flew excitedly about the lawn, stopping abruptly to wheel about and dart off in an opposite direction, a vitalized complement of the spirit of the trees, mingling with and pervading the garden as freely as did the light and air. She threw herself against a summer warbler almost knocking him off his perch and, not content with this treatment, drew him from the lawn, which, by the way, was his own harvest field where he had gleaned diligently for several days.

Then the bird poised before me in mid-air, circled about my head before plunging into an apple tree in whose leafy mazes she disappeared. Just at that moment an accommodating breeze displaced the leaves; there was a flutter within, a flash of wings, an unusual agitation that told of something quite beyond the ordinary. As the breeze died away the leaves resumed their place thus preventing all further inspection. From the parlor windows, fortunately, there was less obstruction, —she was still twisting about, going and returning, dropping within the foliage and going through the most singular antics.

An opera-glass revealed the meaning; she dropped into a half-finished nest that had all this time been directly in range of vision. The tiny tenement was so deftly concealed, blending in color and apparent texture with the bough that held it, and so sheltered by overhanging leaves that it was still difficult to locate a second time.

With unbounded delight I watched her come and go a dozen times in less than that number of minutes, bringing at each arrival a quantity of vegetable fiber soft as a silken cobweb, adjusted invariably while standing inside the nest and turning completely around several times as if shaping the interior to her better satisfaction. She reached far over and pulled the fluffy cotton into place, beating it here and jerking it there, sinking her little breast into and shaping it to fit the soft contours of her body; or, covering the outside with trailing wings, beat them rapidly against the felted foundation which at these times was entirely hidden beneath their iridescence. Though still unfinished the delicate structure was lichen-decorated, simply perfect so far as it went, in this case defying the assertion that humming birds' nests are always completed before this ornate decoration is added.

In the succeeding weeks—weeks in which I entertained an angel, not unawares, her two ways of approach were unvaried; either passing the nest

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The changes a Feather undergoes in turning from Green to Yellow.

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entirely to rise from beneath, or, hovering over and over, drop down as lightly as a snowflake or the petal of an apple blossom. And such a pretty proprietary air—the complacence and importance for which great possessions are often answerable! As if the trees were there for her alone, the garden made simply for her convenience!

After working rapidly for two full hours she paused to rest upon a dead twig, opening and closing her wings in the twinkling fashion of a bluebird, an exercise prefacing a breakfast taken in the nearest tree as she poised beneath the leaves.

With appetite appeased she dropped upon the unfinished cradle and sat so still for twenty minutes that I was certain an egg was deposited. Doubtless the misfortunes attending previous nesting had interrupted the even tenor of life, the second housekeeping was more urgent than was anticipated.

For ten minutes more her form was motionless though her head moved from side to side in a ceaseless surveillance—a warbler lunching in the next tree glanced casually in her direction, and was evidently just wild with curiosity.

The situation was too much for him; he left his post hurriedly, flew over her and looked down, flew under and looked up, peered at her from an airy poise, still undecided as to who was rocking in that wonderful cradle. Craning his neck he hopped along the branch till he stood beside her, so near that his yellow coat literally brushed her garments, his attitude a quick pantomime of his thoughts, half paralyzed with questioning surprise as to what this remnant of a bird might be, not by any means to be bought *cheap* because it was a remnant.

A quick thrust from the hummer's beak brought him to his senses; he took leave for a few seconds, returning cross-lots to stare again from the same near point of view, which unwarranted impertinence was borne without flinching or changing her position. Later on these tours of inspection were thoroughly resented, the right of territory contested in many a battle when the defendant advanced and retreated with the rapidity of lightning, making furious thrusts at her adversary, and chasing him about till sheer exhaustion compelled her to desist. Then she would drop upon the nest still regarding him with undistinguished contempt till he took her to the tree-top, keeping an eye upon her as he dropped a song or swallowed an insect.

A young woodpecker came one day to her door; two quarrelsome robins stopped to say good morning; and goldfinches lisped their soft love notes, while she only hugged her eggs more closely with the dear, delicious shyness of affection.

When my little house-builder left that morning I was sure that the edge of a white egg rose above the low rim of the nest. From the attic window it was plainly visible, the cradled egg rocking in the wind, but, though the warbler was close by, to his credit be it said he did not once trespass upon other people's property.

Twice that afternoon my lady buzzed through the trees without halting to look in at home, nor when night came down did the wanderer return. She was busy about the next morning, all work being done in the early hours, and by eight o'clock a second egg lay beside the first. By nine o'clock the following morning the regular brooding began, the finishing touches being given to the nest long before the breakfast hour.

It was a noisy location, what with the clatter of lawn mowers, the drumming of pianos, and the singing of canaries, to which she listened with neighborly interest. In that chosen place, directly over the path leading from the sidewalk to the door, it was impossible to find even a degree of seclusion. The weather was fine, the piazza rarely vacant, and there were few hours in the day but someone passed the nest.

Nor did the trouble end with daylight; bicycle parties made the yard a starting-point for evening excursions, lanterns flashed while parting guests halted beneath the little house-beautiful, until I trembled for poor "Queenie" thus barred away from her own door.

Though she unvaryingly left the nest,

the persons passing were never once conscious of the nearness of bird or nest, swinging breezes often bringing the latter so near that it almost touched their faces.

I could see it hourly from my window, the overhanging leaf, the opalized lustre of the brooding bird, as if a store of sunshine was shivered, and falling over her feathers, then momentarily hidden as the swinging leaf intervened. More solid pursuits were forgotten or for the time regarded as of little importance; each delicate outline became familiar; the brooding leaf assumed a personality; it was a guardian of the home, vitalized, spiritualized, protective. It seemed to change position as the sun made the need apparent, shielding the little one in the long waiting days, so patient and passive in the sweet expectancy of nearing motherhood. My memory pictures her still, while a more tangible photograph upon my desk gives permanence to my "bird of the musical wing" as she brooded over the apple-tree nest.

With this home as a focus, lawn and garden seemed to hold the sunshine in suspension; uplifted grasses gave it recognition in smiling approval; shadows were invested with humane and beneficent attributes, and the very air was radiant with scent and gracious influence.

Sometimes the bird came to my window, her beak clicking against the glass in a vain effort to probe the flowers within.

There were visits, too, to the piazza, when the family were gathered there, poising above the embroidered flowers upon a lady's slipper and trying persistently to taste their illusive sweetness.

Thrice upon the fourth day of sitting she improved the nest with an extra beakful of cotton, holding it firmly for five or ten minutes before it was inwrought. This was repeated after two weeks when there was a decided change—the little, warm breast was pressed less closely against the nest treasures. Some amazing instinct, directly opposed to that dear experience by which *we* find a short path to a long wandering, taught her that their increased fragility would yield to her full weight, and her touch was of exquisite softness.

When three full weeks had passed a homely baby no bigger than a honey bee lay in the nest, a one day's advantage kept to the end, and noticeable in both size and strength. The next morning this mite was duplicated, their whole bodies trembling with every heart beat.

Life became now a problem of supply and demand, only a clearer expression of the one that has from all time agitated humanity. Then began that marvel of marvels, the feeding of the newly hatched birds. It was hardly worth while to question the wisdom of the process, though I confess that after each feeding I expected only two little mangled corpses would remain!

The food, partially digested in the mother's stomach, was given by regurgitation, her beak being thrust so far down their throats that I surmised it would pierce the bottom of the nest, to say nothing of the frail bodies churned violently up and down meanwhile. The great wonder was that the infants survived this seemingly brutal and dangerous exercise in which they were sometimes lifted above the nest, the food being given alternately at intervals of half an hour to an hour. They thrived, however, under a treatment that gave strength to the muscles, besides aiding in the digestion of food.

From the first, the comparative length of beak was their most noticeable feature, the proportion becoming less marked by the fourth day when fine hairy pin-feathers appeared, these increasing in size and reinforced by a decided plumage seen above the rim of the nest before the second week ended.

By the ninth day they attempted their first toilet, drawing the incipient feathers, mere hairs, through the beak, and on the tenth day, more surprising still, they had found their voices. Several times daily the branch was pulled down to the level of my eyes, the twins regarding me with the surprise and innocence of babyhood, sinking low into the nest meanwhile, and emitting a plaintive cry almost human in its pathos and expression.

So far as I know no observer has recorded this pleading, pathetic note from the infant hummers so noticeable whenever I came too near. The branch replaced and the disturbing element removed, they reappeared above the nest's rim, the slight form of the mother palpitant as she hovered near. Early in their lives when a cold rain followed the long drouth, her enforced absences were brief; hasty trips merely to the flower garden in the rear of the house, or to the flowering beans in the next yard, a favorite lunch counter patronized every hour ordinarily.

The leaf that served to so good purpose in the sunny days became heavy with raindrops, tilted to one side, and little streams trickled down upon her back and ran off her tail, while big drops splashing down from the higher branches threatened to annihilate the whole affair. Undaunted still, my Lilliputian mother hugged her precious charges, with drooping tail hanging over the edge of the nest, head drawn into her feathers, her whole appearance as limp and bedraggled as a hen caught out in a shower. When the infants had seen two weeks of life they refused to be longer brooded. From this time on they matured rapidly, filling the nest so full that my lady found no place for the sole of her foot, and often alighted upon their backs to give them food. In four days more their baby dresses were quite outgrown. These were replaced by green graduating gowns of stylish texture and fit, and, as my bird book stated that young hummers left the nest when a week old, I was watching eagerly for their debut.

Long before this the nest proper began to show signs of hard service. Before its occupants left it became a thing of the past, positively dissolving to a mere shelf or platform, and one side falling out entirely, the imperturbable twins sitting or standing upon what remained, content in the silence that all completed tasks deserve.

As I have said before, one of these little grown-ups surpassed the other in size and vigor, insisting gently or forcibly upon the best standing-place, and vibrating its wings for several seconds at a time. Plainly this one would be the first to launch upon the world.

Twenty-two days after hatching it spread its wings without apparent effort and alighted upon a neighboring twig. Clearly, life was regarded from a mature standard as it preened its plumage and looked about with an undaunted air.

Two days later the smaller twin followed the example, reaching the upper branches as easily as if flight were an every-day occurrence, both birds flitting about the familiar tree, and fed by the parent, until after the third day, they were seen no more.

There is something noble, simple, and pure in a taste for trees. It argues, I think, a sweet and generous nature to have this strong relish for beauties of vegetation, and this friendship for the hardy and glorious sons of the forest. There is a grandeur of thought connected with this part of rural economy. It is worthy of liberal and freeborn and aspiring men. He who plants an oak looks forward to future ages, and plants for posterity. Nothing can be less selfish than this. He cannot expect to sit in its shade nor enjoy its shelter, but he exults in the idea that the acorn which he has buried in the earth shall grow up into a lofty pile and shall keep on flourishing and increasing and benefiting mankind long after he shall have ceased to tread his paternal fields.—*Washington Irving.*

A DAY IN JUNE.

Bright is this day of smiling June,
When nature's voice is all atune

In music's swelling flow, to sing
Sweet songs of praise to nature's king.

From azure heights the lark's loud song
Is borne the balmy breeze along;

The robin tunes his sweetest strain,
And blithely sings his glad refrain

Of summer days and summer joys;
The tawny thrush his voice employs,

In chorus with the warbling throng,
To fill his measure of the song.

The river, too, with rippling flow,
As it winds through its banks below,

And leaps and plays in merry glee,
O'er rocky bed, 'neath grassy lea,

Or silent glides through sylvan shade,
To laugh again in sunny glade,

Sends back its murm'ring voice to swell
The music of each lovely dell,

Where Flora decks with brilliant sheen
The virgin sward of velvet green.

—From a forthcoming poem by Geo. H. Cooke, Chicago.

FROM COL. CHI. ACAD. SCIENCES.
6-99

WESTERN YELLOW-THROAT WARBLER.
Life-size.

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WESTERN YELLOW-THROAT.

(*Geothlypis trichas occidentalis.*)

The birds are here, for all the season's late.
They take the sun's height, an' don' never wait;
Soon's he officially declares it's spring,
Their light hearts lift 'em on a north'ard wing,
An' th' aint an acre, fur ez you can hear,
Can't by the music tell the time o' year. —*Lowell.*

THIS common, but beautiful resident of the western United States begins to arrive about the middle of April and leaves during the month of September. It is one of the most conspicuous of the warbler family, is very numerous and familiar, and is decked with such a marked plumage that it cannot fail to be noticed. The adult male is olive-green above, becoming browner on the nape. The female is duller in color than the male without black, gray, or white on head, which is mostly dull brownish. The yellow of throat is much duller than in the male. The young are somewhat like the adult female. This is said to be the prevailing form in Illinois and Indiana, the larger number of specimens having the more extensively yellow lower parts of the western form, though there is much variation.

This little fellow is found among the briars or weed-stalks, in rose bushes and brambles, where it sings throughout the day. Its nest, generally built between upright weed-stalks or coarse grass in damp meadow land, is shaped like a cup, the opening at the top. The eggs vary from four to six, and are of a delicate pinkish-white, the larger end marked by a ring of specks and lines of different shades of brown. The western yellow-throat inhabits the Mississippi valley to the Pacific coast. It is found as far north as Manitoba; south in winter from the southern United States, through central and western Mexico to Guatemala. With a few exceptions the warblers are migratory birds, the majority of them passing rapidly across the United States in the spring on the way to the northern breeding-grounds. It is for this reason that they are known to few except the close observers of bird life, though in season they are known to literally swarm where their insect food is most plentiful—"always where the green leaves are, whether in lofty tree-top, by an embowered coppice, or budding orchard. When the apple trees bloom the warblers revel among the flowers, vying in activity and numbers with the bees; now probing the recesses of a blossom for an insect which has effected lodgment there, then darting to another, where, poised daintily upon a slender twig, or suspended from it, he explores, hastily, but carefully for another morsel. Every movement is the personification of nervous activity, as if the time for the journey was short; and, indeed, such appears to be the case, for two or three days, at most, suffice some species in a single locality; a day spent in gleaning through the woods and orchards of one neighborhood, with occasional brief siestas among the leafy bowers, then the following night in continuous flight toward its northern destination, is probably the history of every individual of the moving throng."

CHARLEY AND THE ANGLEWORM.

ALICE DE BERDT.

CHARLEY was going fishing and he took great pride in the quantity of squirming bait he carried in the tin box.

He was quite a small boy, only eight years old, but country boys learn to take care of themselves sooner than city children.

When he reached the little stream where he meant to fish, he found some one before him. It was a stranger whom Charley had seen once or twice at a neighbor's, where he was boarding during the summer.

The old mill was the best place in miles for fish, and Charley wished that the city boarder had chosen some other spot in which to read his book.

He gave a shy, not very cordial reply to the stranger's pleasant "Good morning!" and began to arrange his line. In a few minutes one of the largest earth-worms was wriggling in the water at the end of Charley's hook, and he himself was sprawled out upon the ground at the end of a long beam projecting from the mill intently regarding the water.

"No luck, my boy?" asked the stranger, watching Charley work with the struggling worm that was as hard to get off the hook as it had been to put on.

"No, sir," replied the little boy. "The fishes don't seem to bite."

"Not hungry to-day, eh?" said the stranger. "I should think that would be a good thing for the worms."

Charley opened his eyes. It had never occurred to him to consider the worms in the matter. They were to him nothing but ugly, stupid things, which, his father said, injured the roots of plants.

"Don't you think the worms are as fond of their life as you are of yours?" went on Charley's new friend. "In their little underground earth houses they are very comfortable and happy."

Charley smiled. This was a new view of the case to him, and he edged nearer to the stranger to hear what more he would say.

"They's on'y worms," said Charley.

"And a worm is a very good sort of creature in its way. They are harmless, cleanly animals. See, I can take that one of yours in the palm of my hand and it will not harm me in the least. Let me put it down on the ground and see how it hurries to get away. It is frightened. Now it is trying to force a way into that damp earth. I wonder if you know just how the worm makes its way through the ground."

Charley shook his head, and the stranger said:

"You have often noticed the shape of the worm, I dare say. One end of its body is much thicker than the other, which runs to a point. The thicker end of the body is the head. The body itself, you will see, is made of many small rings, held together by tiny muscles and skin, making it possible for the worm to bend and curl and wriggle in a way that is impossible for you and me, whose bones are fewer and fitted tightly together, so that they move about less easily.

"Now, if you will take this one in your hand," said the stranger, "and run your fingers very gently down its sides from tail to head, you will find that the body of the worm is covered with fine hooks. If you run your fingers along the worm in the other direction, you will think the body perfectly smooth. This is because all the hooks point in the other direction.

"When the worm wishes to enter the earth, it pushes its blunt head through the soil, lengthening its body by means of the muscles that hold together the soft, cartilage-like rings. At first only a few rings go into the ground. Master Worm then draws up his body into a thick roll by shortening his muscles. In this way he forces apart the soft earth to make room for his body, the points on the sides holding it there while he again lengthens his head, push-

ing more earth apart. It is in this way, by alternately or in turn lengthening or shortening his body that he makes his way through the earth, which is pushed aside to give him passage through its dark depths.

"As his home is underground, eyes would not be of much use to him, so Mother Nature, whose children we all are, has given him none. One of her laws is that none of us shall have what we cannot or do not make use of. He has a strong mouth, however. It is placed on the second ring of the body. His food is earth, which he swallows to obtain the organic particles contained in it. This makes him especially interesting, for nearly all animals obtain their food from the soil quite indirectly. Some get it from plants, the plants themselves having gathered theirs from the earth through their roots. Certain animals depend on other creatures, which in turn get food from the plants.

"The life-giving particles which go to build up all bodies come directly or indirectly from the earth itself. It seems odd that a man who is starving, no matter where he may be, starves with the very food which he needs directly beneath his feet, only he does not know, nor has the wisest man yet learned, how to convert it into food which will directly sustain and give health to the body. Yet the little earthworm, which you despise as stupid, has this wonderful secret, which day by day it puts into operation for its own benefit. Worms also eat leaves, which sometimes they drag into their homes.

"The worm has no feet as we understand them, but moves along the ground by sticking its sharp claws into the ground and by in turn lengthening and shortening its flexible body.

"The young worms grow from eggs, which are deposited in the earth in the autumn. They have to look out for themselves. During the winter they burrow deep into the ground, coming to the surface with the warm rains of spring. Worms also come to the earth's surface at night. If you look carefully in the garden with a lantern some evening, you may see them."

Charley was looking at his bait box with a good deal of respect.

"I guess I'll let the worms have another chance," he said, and he dumped them in a heap upon the ground, when, I regret to say, two hungry robins promptly pounced upon them and flew jubilantly home with two of the fattest in their beaks for a meal.

The stranger smiled kindly upon Charley.

"Never mind, my boy. Old Dame Nature meant the worms for food for the robins and perhaps bait for your hook when you really need fish for food, but she never meant any of us to needlessly harm any living creature, for when you are older and have learned to read well in her great story book you will find that after all, from earthworms to kings, we are only brothers and sisters in wise old Mother Nature's great family.

"I once knew a little boy like you who used to salute every living creature he met with 'Good morning' or 'Good afternoon' or 'Good evening.' He said it made him feel more friendly toward them. In his spare moments he loved to watch the woodland creatures and learn the secrets of their busy, useful lives."

"Where does he live?" asked Charley.

"Well, when he is not rambling over the earth hunting for curious insects he lives in a big city, where he sometimes writes books about butterflies and moths and other insects, and people, who as a rule know very little about the humbler children of nature's family, give him credit for being a rather wise man; but he really knows very little—there is so much to learn. Some day, when you are a man, if you keep your eyes open to what goes on around you, you yourself may know how little. That boy is a man now and takes great pleasure in having introduced you to Master Chætopoda, one of the humblest but most interesting members of Mother Nature's household."

And then Charley smiled, for he knew the stranger was talking about himself.—*Success.*

THE MYRTLE WARBLER.

(*Dendroica coronata.*)

C. C. M.

ONE of the most interesting facts concerning this beautiful warbler is that, though not common, it is a winter sojourner, and therefore of perpetual interest to the student of birds. About the last of March, however, multitudes of them may be seen as they begin to move northward. By the middle of April all but a few stragglers have left us, and it is not till the last of September that they begin to return, the majority of them arriving about the middle of October. The habitat of the myrtle warbler includes the whole of North America, though it is chiefly found east of the Rocky Mountains, breeding from the northern United States northward into the Arctic regions; and, what is regarded as strange for so hardy a bird, has been found nesting in Jamaica. Its winter home is from about latitude 40° south into southern Central America.

The adult female myrtle warbler is similar to the male, but much duller in color. In winter the plumage of the sexes is said to be essentially alike. The upper parts are strongly washed with umber brown, and lower parts more or less suffused with paler wash of the same. The young have no yellow anywhere, except sometimes on the rump. The whole plumage is thickly streaked above and below with dusky and grayish white.

The places to study these attractive warblers are the open woods and borders of streams. In their northern winter homes, during the winter months, spiders, eggs and larvæ of insects constitute their principal food, though they also feed upon the berries of the poison ivy, and in the early spring, as they move northward, upon "insects that gather about the unfolding leaves, buds, and blossoms." Col. Goss says that in the spring of 1880 he found the birds in large numbers on Brier Island and other places in Nova Scotia, feeding along the beach, in company with the horned lark, upon the small flies and other insects that swarm about the kelp and debris washed upon the shore. "They utter almost continually, as they flit about, a *tweet* note, the males often flying to the tops of the small hemlocks to give vent to their happiness in song, which is quite loud for warblers—rather short, but soft and pleasing."

These birds usually build their nests in low trees and bushes, but Mr. MacFarlane, who found them nesting at Anderson River, says they occasionally nest on the ground. Mr. Bremer says that in the summer of 1855, early in July, he obtained a nest of the myrtle warbler in Parsborough, Nova Scotia. It was built in a low bush, in the midst of a small village, and contained six eggs. The parents were very shy, and it was with great difficulty that one of them was secured for identification. The nest was built on a horizontal branch, the smaller twigs of which were so interlaced as to admit of being built upon them, though their extremities were interwoven into its rim. The nest was small for the bird, being only two inches in depth and four and a half in diameter. The cavity was one and one-half inches deep and two and a half wide. Its base and external portions consisted of fine, light dry stalks of wild grasses, and slender twigs and roots. Of the last the firm, strong rim of the nest was exclusively woven. Within the nest were soft, fine grasses, downy feathers, and the fine hair of small animals.

The eggs are three to six, white to greenish white, spotted and blotched, with varying shades of umber brown to blackish and pale lilac: in form they are rounded oval.

In autumn, when the myrtle warblers return from Canada, they mostly haunt the regions where the juniper and bayberries are abundant. The latter (*Myrica ceifera*), or myrtle waxberries, as they are frequently called, and which are the favorite food of this species, have given it their name. These warblers are so restless that great difficulty is experienced in identifying them.

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FROM COL. F. M. WOODRUFF.
6-99

MYRTLE WARBLER.
Life-size.

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TAFFY AND TRICKSEY.

CAROLINE CROWNINSHIELD BASCOM,

A FEW of my readers may know who Taffy and Tricksey are, but as more will not I think it best to introduce them.

Taffy is the handsomest tiger cat I have ever seen, and as he has the crook in his tail, he belongs to the Tabby breed. Taffy is very large, usually weighing fourteen pounds, but he has a very small head, and very small, finely shaped paws. The under parts of them look like black velvet. In color he is jet black and the other fur very much like a raccoon's, light tan at the ends shading into yellow, then into drab. As the sun strikes him every hair seems full of light and he is one mass of iridescent colors. His marking is most beautiful. The top of his head is black branching out into five narrow black stripes down his neck. A black stripe three inches wide (without one light hair) going all the way down the back and to the end of the tail and under two inches; of course, on the tail the stripe is much narrower. Then, narrow black stripes go down each side of his back and tail. His tail is not long, but very bushy like a nice boa. I never saw more exquisite coloring and marking than Taffy has underneath, from his throat to his tail. His coat is beautifully soft and thick, and shines like satin, and his eyes are very green. He is particular about his toilet, but insists upon my helping him to keep it glossy. His own comb is kept on my dressing-table, and he asks me to comb him twice a day, and sometimes oftener.

I can tell you nothing of Taffy's antecedents, as I found him one morning in our back yard starved almost to death, and about as thick through the body as a shingle. At first I thought he had dropped down from Heaven, but I soon learned from his sayings and doings that he must have been quite intimate with the inmates of the lower region. I tempted him with chicken but it was some little time before I could put my hand on him; and to tame any animal you must be able to touch it with your hand. After two or three pats he seemed to realize that I was a good friend. Soon I had him in the house and for three years we have been devoted to each other. I have had a great many cats, but never one who had so much of the wild animal in him. All of my friends said I never could tame Taffy and it was many weeks before I had much influence over him, and I never feel quite sure now whether I am to be loved or scratched, as he still has the temper and the actions of a tiger when anything goes the wrong way.

He usually lies down like a tiger with legs straight out in front, tail straight out behind, and when I speak to him he will always blink his eyes and speak to me. If you touch him in passing he will grab at your feet and spit and growl. He never mews when he wants anything to eat, but will chase me or my maid, and grab at our feet. If he does not like what is given him to eat, he will walk all about his plate, and scratch as if he were covering it up.

I am the only one Taffy ever shows much affection for, but to me he is very loving. He will lie as long as I will let him with his paws about my neck, and head on my shoulder. If he is sound asleep anywhere, and I begin to read aloud, sing, or whistle, he will get directly up, jump on my lap, put his paws about my neck, his face close to mine, and begin to purr. As he always looks very pleasant I flatter myself he likes the tone of my voice.

When I had my bird, Little Billie, it would make Taffy simply furious if I put him out of my room and closed the door. One morning he was so ugly my maid did not dare open the door to come in. After that when I wanted him to go down stairs, I had my maid come to the bottom of the stairs and call "Taffy!" then there was never any trouble. When he is in a tearing rage I can always quiet him, by taking

tight hold of his paws, and kissing his eyes. I have told all of these things about Taffy so my readers will appreciate what I have been able to do with him. It is needless to say that when Little Billie went away, Taffy was the happiest cat in town. His devotion increased daily to me and he lived in my room, only going down to get something to eat.

I think by this time you are very well acquainted with Mr. Taffy, and I will present Tricksey to you. Of all the canary birds I have ever seen Tricksey is the prettiest, daintiest little bird you can possibly imagine. His color is light yellow with a much deeper shade between his wings, shading into almost an orange. His wings and tail are white with just a line of yellow on some of the feathers. His eyes are unusually large and bright, and his little legs and claws are very pink, and so slender they do not look strong enough to support his finely shaped body. Tricksey came from George H. Holden's, New York, so you will all know he is a very superior bird and sings like an angel.

Tricksey had never been out of his cage when he came to me, but before I had had him a week, he came out, perched on my finger, took things from my finger or mouth, would kiss me, and go all about my room on my finger, and very soon went all about the house with me. He was very fond of sweet apple, but I never let him have it inside his cage, but made him come to me for it. I kept a piece in a little dish on my table and he soon found out where it was and would help himself on the sly. I also kept on my table in a little china cup, some hemp seed which I gave to Tricksey as a great treat. Every time I would tap on the cup and make it ring, Tricksey would come out of his cage, down from a picture frame, or wherever he was, for a seed.

One day he had had his one hemp seed, and teased for more, but I said "no" and he went flying about the room having a fine time. Soon he flew back on the table, hopped over to the cup, gave it two or three taps to make it ring, then hopped on to the top, reached down and helped himself to two seeds. Tricksey is a very vain little bird and likes nothing better than to go over on my dressing table, walk back and forth in front of the mirror or sit on my pin cushion and admire himself.

Tricksey came to me one afternoon and Taffy knew nothing about his arrival until the next morning. When he came upstairs and saw a little yellow bird in a house of gold, he was like the little girl's Bunnie, who "was not a bit afraid, but awfully much surprised," when she heard firecrackers for the first time. His eyes were like balls of fire, while his mouth opened and shut making a hissing sound, and his tail going at the rate of a mile a minute. He walked into my room like a wild tiger, with an air as much as to say, "If this is Little Billie come back dressed in yellow, die he must," and sprang at the cage. I took him firmly by the paws, looked straight into his big angry eyes and said in a soft, firm voice, "Taffy, this is Tricksey, and he is not to be eaten or hurt any more than my Little Billie who went away." I let go of his paws, he walked out of my room and downstairs without looking back. In about an hour I looked out into the hall, and there sat my dear old Taffy on the top step looking very meek and wishful. I spoke kindly to him and asked him to come in and see his new brother Tricksey. After a few moments he came in very slowly and went behind my bed. Soon he came from under the valance, (the cage sat on a chair and I in front of it) never looked at the cage, jumped into my lap, put his paws about my neck and began loving me. I took him to bed with me and he never moved until Tricksey began to sing in a most delightful way, then he looked at him and listened very intently. I talked to him,and "smoothed his feathers," and soon he snuggled down in my arms and went to sleep. When he got out of bed he never glanced at the cage, but went directly downstairs, and I felt I had made a good beginning. Everyone said I could never teach Taffy not to catch Tricksey, and the reason his catship did not kill Little

Billie was because he was afraid of him, and so carefully watched. I knew there was not a place in the house I could hang the cage where Taffy could not get at it if he made up his mind to do so. Of course for days and weeks I felt anxious, and did not mean to leave them alone together. I never turned Taffy out of my room. If he went up to the cage and put up his paw I would say "Taffy, you must *not* put your paw on the cage," and as he always minds he would take it right down, sit by the cage, and I would talk to him kindly. Fortunately Tricksey was not at all afraid of Taffy.

Taffy always wears a yellow satin collar with bells all around. Often I would hear him coming upstairs when I was lying down and I would keep very quiet to see what he would do. Sometimes he would come over to the cage, look at Tricksey pleasantly, then lie down by the fire and go to sleep; more often he would lie down without even looking at him. But the moment he heard me talking to Tricksey he would get up and come to me to be petted, and I always gave him a great deal. One day when Taffy was in another room I let Tricksey out, and tried to be very quiet. I was sitting on the floor with Tricksey hopping about me. Before I hardly knew it Taffy was in my lap, and soon I had Tricksey on my knee eating seeds. If I took the cage on my lap with Tricksey inside Taffy would immediately jump up and crowd in between the cage and me.

Taffy was very much afraid the first time he saw Tricksey take his bath, and ran under the bed and peeped out from under the valance.

One morning the cage sat on the floor, and Tricksey was ready for his bath, when Taffy came in and sat close to the cage. Tricksey took a big drop of water into his bill and threw it into Taffy's face, Taffy moved back a little and looked all about to see where it came from. While he was looking Tricksey went into his bath, and splashed the water all over Taffy's face in a very roguish way. To say Taffy was surprised is speaking mildly. He turned to me with an angry cry and went out of the room. The next morning the same thing happened; but instead of going out of the room, he went on the other side, out of reach of the water, but where he could see all that went on.

After that he became so interested he did not mind if the water was splashed all over his face and would sit as close to the cage as he could get. While Tricksey was eating his breakfast he would lie down close to the cage and go to sleep. As I previously said I never meant to leave Taffy in the room with Tricksey, but he was often there hours before I knew it. When I found him he was always asleep in front of the cage or by the fire.

One morning after the bath I put the cage up in the window. Taffy did not seem to like it at all. He looked at me most wishfully, and began talking cat language, and I knew he was saying, "Please put Tricksey back on the floor." I did so, and Taffy began to sing, lay down with his back close to the cage, stretched out and went to sleep. He had been lying that way for an hour when some visitors came. It seemed too bad to disturb Taffy so I left him, and thought I would risk it.

Two hours passed before I went back, and you may imagine my delight when I found my two boys (so different in color, size and disposition) as happy as two kittens. Tricksey was singing merrily. Taffy had wakened, changed his position, and looked as if he felt very proud, being left to take care of his small brother. His eyes were as soft as velvet, and he spoke to me in a soft, cooing tone. Since then I have never felt there was any danger in leaving them together. I regret to say Tricksey has a strong will of his own and almost as bad a temper as Taffy.

At different times I had three wee baby birds brought in to me, but they all died. Tricksey was very jealous of them, and when he saw me feeding them he would become very angry, beat his wings against his cage, and beg for me to let him out. One day I put one of the little strangers on the floor and let Tricksey out. He flew at the waif and tore feathers out of the top of his head. I took the poor little frightened thing in my hand. Tricksey flew

on my finger and pecked at him. I put him in my other hand and Tricksey flew at him more angry than ever. Then I put him on the floor, and Tricksey was so happy he flew on my head, hopped about my shoulders and kissed me in the mouth. In the middle of the performance in walked dignified Mr. Taffy with a look which plainly said, "What more are you going to bring into this room?" He sat by my side looking at the newcomer and, before I knew what he was going to do, reached out his paw, and gave him a good slap which sent him off my lap onto the floor.

Early in the fall before I had any fire in my room I would bring Tricksey down in the morning and keep him until evening, and for two weeks Taffy never went near my room during the day, but stayed down there with Tricksey. The first day I had a fire in my room I did not bring Tricksey down as usual. After I gave Taffy his luncheon I missed him, but did not go to my room until five o'clock, and there was faithful Taffy sound asleep close to Tricksey's cage, and now he stays in my room all day. He has plainly shown that if Tricksey stays there he stays too.

I find that animals want to be treated very much like children. The more intelligent they are the easier it is to influence them, and the quicker they are to read you. First give them a great deal of love and kindness, always be firm, very patient, and above all *never* deceive them in the most trivial thing. I hope this little sketch of Taffy's and Tricksey's life may be of some help to those who love cats and dogs, but have felt they could not teach them to live in harmony together.

A SUGGESTION TO OOLOGISTS.

FRANK L. BURNS,
In Oberlin *Bulletin.*

BEFORE we enter upon another active campaign of bird-nesting, it is fitting that we should pause a moment to reflect upon the true aim of our toil, risks, and trouble, as well as delight and recreation. How many of us can define the phrase "collecting for scientific purposes," which, like liberty, is the excuse for many crimes?

If it is true, as has been asserted, that oology as a scientific study has been a disappointment, I am convinced that it is not on account of its limited possibilities, but simply because the average oologist devotes so much time to the collection and bartering of specimens that no time is left for the actual study of the accumulating shells. In other words, he frequently undertakes a journey without aim or object.

The oologist has done much toward clearing up the life-history of many of our birds, but as observations of this nature can often be accomplished without the breaking up of the home of the parent bird, it alone will not suffice as an excuse for indiscriminate collecting. After preparing the specimen for the cabinet his responsibility does not end but only begins. A failure to add something to the general knowledge is robbing the public as well as the birds. He who talks fluently of the enforcement of strict laws for the preservation of our wild birds, their nests and eggs, and fails to protect and encourage those about his premises, falls short of his duty; and if his cabinet contains bird skins or egg shells which might just as well have remained where Nature placed them, he is inconsistent, demanding that others abstain that he may indulge.

In conclusion I would say that when an oologist constantly keeps in mind and acts under the assumption that the birds are his best friends and not his deadly enemies, he cannot go far wrong, and the means he employs will be justified in the light of subsequent study and research of data and specimens. If any of us fall short in this we have only ourselves to blame. Let us then collect with moderation and fewer eggs and more notes be the order of the day.

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FROM COL. CHI. ACAD. SCIENCES.
6-99

BLUE-WINGED YELLOW WARBLER.
Life-size.

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NATURE STUDY PUB. CO., CHICAGO.

THE BLUE-WINGED YELLOW WARBLER.

(*Helminthophila pinus.*)

NOT a great deal is known about many of the warblers, and comparatively little has been observed of this member of the very large family, comprising more than one hundred species. This specimen is also recognized by the name of the blue-winged swamp warbler. Its habitat is eastern United States, chiefly south of 40 degrees and west of the Alleghanies, north irregularly to Massachusetts and Michigan, and west to border of the great plains. In winter it lives in eastern Mexico and Guatemala.

It has been pointed out that the name of this bird is misleading, as the blue of the wing is dull and inconspicuous, and not blue at all in the sense in which this color distinction is applied to some other birds. When applied to the warblers, it simply means either a bluish-gray, or slate, which seems barely different from plain gray at a short distance.

In half-cleared fields which have grown up to sprouts, and in rich open woods in the bottom-lands, where the switch-cane forms a considerable proportion of the undergrowth, the blue-winged yellow warbler is one of the characteristic birds, says Ridgway. The male is a persistent singer during the breeding-season, and thus betrays his presence to the collector, who finds this, of all species, one of the easiest to procure. His song is very rude. The nest is built on the ground, among upright stalks, resting on a thick foundation of dry leaves. The eggs are four or five, white, with reddish dots. The food of the warbler consists almost wholly of spiders, larvæ, and beetles, such as are found in bark, bud, or flower. The birds are usually seen consorting in pairs. The movements of this warbler are rather slow and leisurely, and, like a chickadee, it may sometimes be seen hanging head downward while searching for food.

INDIRECTION.

"We hear, if we attend, a singing in the sky."

RICHARD REALF.

Fair are the flowers and the children, but their subtle suggestion is fairer;
Rare is the rose-burst of dawn, but the secret that clasps it is rarer;
Sweet the exultance of song, but the strain that precedes it is sweeter;
And never a poem was writ, but the meaning outmastered the meter.

Never a daisy that grows, but a mystery guideth the growing;
Never a river that flows, but a majesty scepters the flowing;
Never a Shakespeare that soared, but a stronger than he did enfold him;
Never a prophet foretold, but a mightier seer hath foretold him.

Back of the canvas that throbs, the painter is hinted and hidden;
Into the statue that breathes, the soul of the sculptor is bidden;
Under the joy that is felt, lie the infinite issues of feeling;
Crowning the glory revealed, is the glory that crowns the revealing.

Great are the symbols of being, but that which is symboled is greater;
Vast the creation beheld, but vaster the inward Creator;
Back of the sound broods the silence; back of the gift stands the giving;
Back of the hand that receives, thrills the sensitive nerve of receiving.

Space is nothing to spirit; the deed is outdone by the doing;
The heart of the wooer is warm, but warmer the heart of the wooing;
And up from the pits where these shiver and up from the heights where those shine,
Twin voices and shadows swim starward, and the essence of life divine.

OUT-DOOR SCIENCE.

FREDERICK A. VOGT,
Principal Central High School, Buffalo.

THE first step to take in teaching science to young people and in popularizing the study among older people is to throw away much of the traditional polysyllabic phraseology and use a little common sense and good old Anglo-Saxon now and then—to teach nature, instead of science.

There is not only great danger in being too technical, but in telling too much. We all like to talk on our pet subjects. We rattle along, airing our opinions and pouring out big volumes of knowledge, and expect the poor pupils, like great dry sponges, to absorb the gracious gift. But they don't absorb; it isn't their business; they belong to quite another sub-kingdom; and while we are just about to congratulate ourselves on our facility of expression and wise beneficence, we are rudely made aware that our eloquence was all lost; and, worse still, we have been guilty of repression, of stifling natural curiosity, and crushing what might become a priceless, inquiring, intellectual habit.

Is it any wonder that so few ever go on with this geology, mineralogy, botany, or zoölogy, after they leave school? What is our object as teachers? Is it to cram geology and botany down passive throats in one or two school terms, or is it to lead our students so gently and awaken so keen a desire that they shall study these sciences all their lives, to be a never-ending joy, a pure pleasure and a solace amid coming cares and darkening days? Oh, I, too, have been guilty, and may heaven forgive my exceeding foolishness! The remainder of my days are being spent in penance, in propitiating the office of the recording angel by a more humble and righteous way of life.

So much for the language of the teacher, and now for the means of giving reality to his teaching efforts This can only be done by the laboratory method or investigation in the field. With the latter, out-door work only does this paper especially treat.

ACTUAL CONTACT WITH NATURE.

While I do not for a moment decry the use of books, either for collateral reading or for text-books—in fact, I plead for a wider reading and profounder study of the best scientific writers—still, I feel just as you must feel, that there is something radically wrong in much of our science teaching, and that we have come to regard books as more real than the earth, the sky the rocks, the plants, and the animals, which are all about us.

Just why this is so, I am unable to understand. Nature is so lavish! On all sides, easy of access, are the phenomena and the realities, while the school-room is artificial, and the teacher, alas, in perfect keeping with the school-room.

Can it be that pupils are averse to actual contact with nature? Not at all. From the earliest childhood throughout life there is in most persons a remarkable turn toward curious investigation, and thorough understanding of the things of nature. That I know from my own experience while teaching in the grammar schools.

One day I asked the pupils to bring me in any specimens of stones they might find in the vacant lots and the fields; and then I promised to give them a talk about these stones. I expected perhaps twenty or thirty specimens. What was my amazement and secret horror when, the next day and the next came dozens and dozens of specimens until, in a few days, I had over a ton and a half, containing 3,000 specimens. There were granites, gneisses and schists and quartzes; there were sandstones, slates, shales, limestones, glacial scratchings, marbles and onyx; there were geodes, crystals, ores, stone hammers, arrow-heads, brickbats, furnace slag, and fossils. I took everything smilingly, and at night the janitor and I buried many duplicates and the useless stuff in a deep hole where they wouldn't be likely to get hold of it again.

We soon possessed an excellent cabi-

netful, and had fine times talking about the making of stones—the crust of the earth—former inhabitants, the great ice age, and such simple geology as they could understand; and they did understand; that did not end it. We studied plants in the same way; physics and chemistry, with home-made apparatus. Of course, it all took time, and a good deal of it; and there wasn't any extra pay for it, either; but there are labors whose recompense is far more precious than dollars and cents.

And so I find enthusiasm also for outdoor science, among secondary pupils and among the great body of intelligent people of our cities; and if nature is so accessible, and pupils are so eager for its secrets, and we still worship books and ignore the visible objects and forces so freely at our disposal, there is no other conclusion to arrive at, except that the teacher himself is either too ignorant or too indolent to make proper use of them. It takes time; it needs enthusiasm; it needs a genuine love for the subject in hand, and a profound interest in and sympathy with the student.

The subjects in which field work may be made very useful are geography, geology, botany, and zoölogy, and the objects are, of course, apparent to all. First, it cultivates a familiarity with nature, which is wholesome and desirable. We are living in an artificial age. Children nowadays get too much pocket money; there is too much theater; too much smartness; too much flabbiness for the real business of life; too much blasé yawning; too many parties; too much attention to dress; the color of the necktie; the crease of the trowsers, or the make of a gown. The only meaning science has for many of the richer classes is the curved ball of the pitcher, the maneuvers of the quarterback, or the manly art of self-defense.

I know of nothing that will counteract the indifference of parents and lead the young mind back to a simpler and more humanizing condition of life than to make it familiar with old mother earth, the stream, the valley, the tree, the flower, and the bird.

Another object of field work is to develop habits of correct observation. Pupils ordinarily take too much for granted. They will swallow anything that is printed in a book, or that the teacher may choose to tell, always providing the pupil is sufficiently awake to perform the function. It is hadly an exaggeration that they would believe the moon was made of green cheese, providing the statement came with august solemnity from the teacher's chair. There is too hasty generalization and a prevailing unwillingness to careful examination. Careful field work opens the eye and corrects much of this slovenly mode of thinking, creates honest doubt, and questions an unsupported statement. The pupil wants to see the pollen on the bee before he believes in cross-fertilization; he wants to see rocks actually in layers before he will believe they could have been deposited in water, and he pounds up a fragment of sandstone to get at the original sand; he wants to see the actual castings before he will believe all that Darwin says about his wonderful earthworms; and few things escape the eye of the pupils who go out with the understanding that it is business and their duty to observe and take notes.

Another object of field study is to see life in its environment. Stuffed birds and animals in cases are all very good; shells look pretty behind nice glass doors, and herbaria play a very important part; yet, after all, how much better to see a thrush's flight; to hear the pewee's song; how much more satisfactory to watch a snail creep and feed; how much more delightful to study the blossoming hepatica; to note its various leaves, its soil, its surroundings, and discover why it blooms at the very opening of springtime.

More can be learned from a handful of pebbles on the beach than a whole book written upon the same subject.

Yet another object is to acquire specific information not contained in books. The feel of a leaf, the odor of the honeysuckle, or the pine, the cry of the kingfisher, the locomotion of a horse, and the locomotion of a cow, the formation of miniature gorges in a rain storm, and the wearing of a shore under the action of the waves, these and countless other manifestations can never be described in mere words.—*The School Journal.*

THE GOLDEN-WINGED WARBLER.

(*Helminthophila chrysoptera.*)

THIS member of the large family of warblers is considered rare, or only common in certain localities of its range, which is eastern United States in summer and Central America in winter. Its common names are blue golden-winged warbler, and golden-winged swamp warbler. It makes its appearance in May, when it may occasionally be seen about orchards. It soon retires into dense underbrush, however, and few persons who are not woodsmen ever get more than a glimpse of it. It breeds all through its range, but only casually north of Massachusetts. It builds its nest on or near the ground, in a plant tuft. It is made of grass, and is deep and bulky. The eggs are four or five, white, with reddish dots.

Ridgway says that June, 1885, he found these birds breeding along the southern edge of Calhoun Prairie, Richland county, Illinois, and Mr. H. K. Coale states that on May 11, 1884, in a wood on the Kankakee river, in Starke county, Indiana, he found the golden-winged warbler quite common. Eight were seen—all males, which were singing. Some were flushed from the ground and flew up to the nearest small tree, where they sat motionless next the trunk. The locality was a moist situation, overgrown with young trees and bushes.

PET ANIMALS AS CAUSES OF DISEASE.

PAPERS presented last summer at the French Congress for Tuberculosis at Paris demonstrate, says *The Medical News*, what has hitherto been very doubtful, that aviary and human tuberculosis are essentially the same pathologic process due to the same germ modified by a cultural environment, but convertible under favorable circumstances one into the other. An Englishman has found that more than ten per cent. of canaries and other song birds that die in captivity succumb to tuberculosis, and parrots have come in for a share of condemnation in this connection. By far the larger number of monkeys who die in captivity are carried off by tuberculosis, and while, fortunately, the keeping of monkeys as house pets is not very general, at the same time there is some danger of contagion. Nocard, the greatest living authority on tuberculosis in animals, and the man to whom we owe the best culture methods for the tubercle bacillus, found in a series of autopsies on dogs that out of two hundred successive autopsies on unselected dogs that died at the great veterinary school at Alfort, near Paris, in more than one-half the cases there were tubercular lesions, and in many of them the lesions were of such a character as to make them facile and plenteous disseminators of infective tuberculous materials.

Parrots are known to be susceptible to a disease peculiar to themselves, and a number of fatal cases in human beings of what was at first supposed to be malignant influenza, pneumonia was traced to the bacillus which is thought to be the cause of the parrot disease. Cats are sometimes known to have tuberculosis, and that they have in many cases been carriers of diphtheria and other ordinary infections is more than suspected. There is not at present any great need for a crusade on sanitary grounds against the keeping of pet animals, but they are multiplying more and more, and it does not seem unreasonable that greater care in the matter of determining the first signs of disease should be demanded of their owners, and then so guarding them as to prevent their being a source of contagion to human beings. Attention should be paid to this warning as regards children, as animals play more freely with them and the children are more apt to be infected.

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GOLDEN-WINGED WARBLER.
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A FLY-CATCHING PLANT.

WILLIAM KERR HIGLEY.
Secretary of The Chicago Academy of Sciences.

Queen of the Marsh, imperial Drosera treads
Rush-fringed banks, and moss-embroidered beds.
—*Erasmus Darwin, in The Botanic Garden, 1789.*

SOME of the most interesting forms of nature are not the most showy and are not easily observed by the untrained eye. Many of their characteristics can only be known by carefully conducted investigations, both in the field and in the laboratory.

The advance of science has shown us that it is as natural for some plants to obtain much of their nourishment from the animal world, by a true process of feeding, as it is for animal forms to obtain their sustenance, either directly or indirectly, from the vegetable world.

There are many species among the lower orders of plants that are well known animal parasites, but there are also, among our more highly organized flowering species, forms that improvise a stomach and secrete an acid fluid for the digestion of nitrogenous food which is afterwards absorbed and used in tissue building. These are in no sense of the term parasites.

Such a plant is our common round-leaved sundew (*Drosera rotundifolia*, L.). The generic name Drosera is from the Greek, meaning dew.

This rather insignificant, but pretty little plant is distributed nearly throughout the world, and is usually found in bogs, or in wet sand near some body of water. The flower stalk is seldom more than six or eight inches in height and bears very small white or pinkish-white flowers.

The interesting feature of this species, however, lies in the rosette of about five or six leaves growing from the base of the stem. These leaves lie upon the ground and are usually about one-fourth to one-half of an inch in length, and are generally nearly orbicular in form. The upper side is covered with gland-bearing tentacles. The glands are covered by a transparent and viscid secretion which glitters in the sunlight, giving rise to the common name of the plant. There are usually over two hundred tentacles on each leaf and, when they are not irritated, they remain spread out. The viscid fluid of the glands serves as an organ of detention when an insect lights upon the leaf. The presence of an insect, or, in fact, any foreign matter, will cause the tentacles, to which it is adhering, to bend inward toward the center of the leaf and within a very short time all the tentacles will be closed over the captured insect, which is soon killed by the copious secretion filling its breathing apparatus.

Though these sensitive tentacles are not excited by either wind or rain they are by the repeated touchings of a needle, or any hard substance. It is said that a fragment of hair weighing but 1–78,740 of a grain will cause a perceptible movement.

By experiment it has been shown that a bit of hard-boiled egg, or a fragment of meat as well as an insect will cause not only an inflection of the tentacles but also of the edges of the leaves, thus forming an improvised stomach, the secretion of the glands then increasing and becoming acid. At this stage the secretion is not only capable of digesting but is also highly antiseptic.

This power of digesting and absorbing nitrogenous food is absolutely necessary to the existence of the sundew, for it usually grows in a poor soil and its few and not greatly elongated roots are of little service except to absorb water, of which it needs a large amount for the production of the copious secretion. Specimens may be developed by planting in moist cotton and furnishing with plenty of water.

The length of time that the tentacles will remain inflected depends on the vigor of the leaf and the solubility of the material causing the excitement.

The time varies from one to seven or eight days.

Easily dissolved and readily absorbed food in too large an amount seems to cause overexcitement and overtaxation, and frequently results in the death of the leaf.

The large number of insects, especially flies, captured by these plants would lead one to believe that they are attracted by the odor of the plant, or the purplish color of the tentacles, rather than by the desire to use the leaves as a resting-place.

The sundew belongs to the natural order *Droseraceæ*. This contains about one hundred and twenty-five species, of which one hundred and ten belong to the genus Drosera, and are chiefly natives of Australia, though the round-leaved species is common throughout the United States, Europe, and Asia.

Closely related to the sundew is the Venus fly-trap (*Dionæa muscipula*, Ellis). This is a native in the eastern part of North Carolina only.

The leaf of this plant is provided with two lobes, which close quickly when the sensitive hairs, which are situated on the upper surface of the leaf, are irritated by an insect. The acid secretion flows out and the leaves remain closed till digestion and absorption are completed.

Dr. Asa Gray has referred to this species as "that most expert of fly-catchers."

TREES AND ELOQUENCE.

W. E. WATT.

FORTY years in the pulpit of Plymouth Church in Brooklyn Henry Ward Beecher stood and poured forth a stream of eloquence which shook the world. During the stress of civil war he stemmed the current of English sentiment with his peculiar powers and brought about a change of feeling which was the salvation of our Union. This greatest of our pulpit orators was a lover of trees, and some of his finer passages were inspired by them.

Without doubt, better trees there might be than even the most noble and beautiful now. I suppose God has, in his thoughts, much better ones than he has ever planted on this globe. They are reserved for the glorious land. Beneath them may we walk!

To most people a grove is a grove, and all groves are alike. But no two groves are alike. There is as marked a difference between different forests as between different communities. A grove of pines without underbrush, carpeted with the fine-fingered russet leaves of the pine, and odorous of resinous gums, has scarcely a trace of likeness to a maple woods, either in the insects, the birds, the shrubs, the light and shade, or the sound of its leaves. If we lived in olden times, among young mythologies, we should say that pines held the imprisoned spirit of naiads and water-nymphs, and that their sounds were of the water for whose lucid depths they always sighed. At any rate, the first pines must have grown on the seashore, and learned their first accents from the surf and the waves; and all their posterity have inherited the sound, and borne it inland to the mountains.

I like best a forest of mingled trees, ash, maple, oak, beech, hickory, and evergreens, with birches growing along the edges of the brook that carries itself through the roots and stones, toward the willows that grow in yonder meadow. It should be deep and sombre in some directions, running off into shadowy recesses and coverts beyond all footsteps. In such a wood there is endless variety. It will breathe as many voices to your fancy as might be brought from any organ beneath the pressure of some Handel's hands. By the way, Handel and Beethoven always remind me of forests. So do some poets, whose numbers are as various as the infinity of vegetation, fine as the

choicest cut leaves, strong and rugged in places as the unbarked trunk and gnarled roots at the ground's surface. Is there any other place, except the seaside, where hours are so short and moments so swift as in the forest? Where else except in the rare communion of those friends much loved, do we awake from pleasure, whose calm flow is without a ripple, into surprise that whole hours are gone which we thought but just begun—blossomed and dropped, which we thought but just budding?

Thus do you stand, noble elms! Lifted up so high are your topmost boughs that no indolent birds care to seek you, and only those of nimble wings, and they with unwonted beat, that love exertion and aspire to sing where none sing higher. Aspiration! so heaven gives it pure as flames to the noble bosom. But debased with passion and selfishness it comes to be only Ambition!

It was in the presence of this pasture-elm, which we name the Queen, that we first felt to our very marrow that we had indeed become owners of the soil! It was with a feeling of awe that we looked up into its face, and when I whispered to myself, "This is mine," there was a shrinking as if there were sacrilege in the very thought of *property* in such a creature of God as this cathedral-topped tree! Does a man bare his head in some old church? So did I, standing in the shadow of this regal tree, and looking up into that completed glory, at which three hundred years have been at work with noiseless fingers! What was I in its presence but a grasshopper? My heart said, "I may not call thee property, and that property mine! Thou belongest to the air. Thou art the child of summer. Thou art the mighty temple where birds praise God. Thou belongest to no man's hand, but to all men's eyes that do love beauty, and that have learned through beauty to behold God! Stand, then, in thine own beauty and grandeur! I shall be a lover and a protector, to keep drought from thy roots, and the axe from thy trunk."

For, remorseless men there are crawling yet upon the face of the earth, smitten blind and inwardly dead, whose only thought of a tree of ages is, that it is food for the axe and the saw! These are the wretches of whom the scripture speaks: "A man was famous according as he had lifted up axes upon the thick trees."

Thus famous, or rather infamous, was the last owner but one, before me, of this farm. Upon the crown of the hill, just where an artist would have planted them, had he wished to have them exactly in the right place, grew some two hundred stalwart and ancient maples, beeches, ashes and oaks, a narrow belt-like forest, forming a screen from the northern and western winds in winter, and a harp of endless music for the summer. The wretched owner of this farm, tempted of the devil, cut down the whole blessed band and brotherhood of trees, that he might fill his pocket with two pitiful dollars a cord for the wood! Well, his pocket was the best part of him. The iron furnaces have devoured my grove, and their huge stumps that stood like gravestones have been cleared away, that a grove may be planted in the same spot, for the next hundred years to nourish into the stature and glory of that which is gone.

In many other places I find the memorials of many noble trees slain; here a hemlock that carried up its eternal green a hundred feet into the winter air; there, a huge double-trunked chestnut, dear old grandfather of hundreds of children that have for generations clubbed its boughs, or shook its nut-laden top, and laughed and shouted as bushels of chestnuts rattled down. Now, the tree exists only in the form of loop-holed posts and weather-browned rails. I do hope the fellow got a sliver in his fingers every time he touched the hemlock plank, or let down the bars made of those chestnut rails!

BATS IN BURMESE CAVES.

INTERESTING caves exist at Hpagat, twenty-six miles up the Salween, from Moulmein. They are hollowed out in the base of an isolated limestone hill about 250 feet high, rising precipitously from the river. Capt. A. R. S. Anderson, the surgeon-naturalist, gives an interesting account of these caves in an Indian government report which is abstracted by "Natural Science." The entrance is about twelve feet high and is much ornamented by Buddhistic sculptures. As the sun was setting the party took their stand on the sand-spit facing the entrance of the caves and soon saw a pair of falcons leave their perch on the trees and fly to and fro over the river. They were speedily joined by other birds, including common kites and jungle crows, and the entire flock, to the number of sixty or a hundred, flew to the entrance of the caves, close to which they remained wheeling about in midair. A few minutes later the bats began to issue in ones and twos, and were soon pursued by the birds of prey, but appeared to have no great difficulty in eluding capture by their rapid and jerky flight, and their pursuers made no very determined or long-sustained efforts to capture them, but soon returned to their vigil over the cave. A minute or two passed and a sudden rush of wings was heard, and the bats were seen to emerge from the cave in a dense stream which slowly became more and more packed, and continued of about the same density for some ten minutes and then gradually thinned away, until, at the end of twenty minutes, the last had emerged. The stream of bats when at its maximum was ten feet square, and so dense as to closely resemble smoke pouring from a chimney in a gale of wind. This resemblance was increased by the slightly sinuous course pursued by the bats as they flew off into the afterglow. They were so densely crowded that they frequently upset each other and fell helplessly into the river below, where they succeeded in reaching the bank only to fall a prey to the expectant crow. When the great rush occurred the falcons, kites, and crows entered the stream of bats and, flying along with it and in it, seized as many bats as they required for food. Capt. Anderson, by throwing his walking-stick into the stream of bats, obtained six specimens. During the last twenty years the bats appear to have considerably diminished in numbers, owing to the depredations of their bird enemies and to their constant disturbance by collectors of bat manure.

A METAL BIRD'S NEST.

IN THE Museum of Natural History at Soleure, in Switzerland, there is said to be a bird's nest made entirely of steel. There are a number of clockmaking shops at Soleure, and in the yards of these shops there are often found lying disused or broken springs of clocks. One day a clockmaker noticed in a tree in his yard a bird's nest of peculiar appearance. Examining it he found that a pair of wagtails had built a nest entirely of clock springs. It was more than four inches across and perfectly comfortable for the birds. After the feathered architects had reared their brood, the nest was taken to the museum, where it is preserved as a striking illustration of the skill of birds in turning their surroundings to advantage in building their nests.

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MOURNING WARBLER.
Life-size.

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THE MOURNING WARBLER.

(*Geothlypis philadelphia.*)

BASKETT, in his valuable "Story of the Birds," says that the warbler forms feed variously, but they use little vegetable matter. Some have ground-haunting, and even swamp-haunting habits; others have fringed tongues hinting of juices and nectars, while tree-trunk exploring, as in creepers, nuthatches, titmice, etc., also prevails. They have been described as at once the most fascinating and the most exasperating of birds. In the spring they come with a rush and although the woods may be full of them, only a faint lisp from the tree tops gives note of their presence, and unless you are a very good observer you will not know they are about at all. If you listen to other birds, instead of resolutely devoting yourself to warblers, you will lose the opportunity of the sight of a diminutive bird disappearing in a tree top. Some of the warblers dash about among the leaves on the ground hunting for gnats, others hunt over the branches of the trees, though some of them hop gaily on the ground, while others walk sedately, bobbing their heads or tilting their tails. The majority of the tribe fly northward to nest in pine forests. A few, however, remain and build in our parks, gardens and shrubbery. They are all insect-eaters, destroying ants, flies, caterpillars, larvæ, plant lice, canker-worms, and May flies. They are therefore of great value in the protection of vegetation.

The mourning warbler, whose common name is black-throated ground warbler, has its habitat in eastern North America, breeding from northern United States northward; more rare in the Atlantic states. It winters in southeastern Mexico, and Costa Rica, and thence south to Colombia. During the spring migration this bird is very common. Early in May, 1881, they were found in abundance near wheat lands in Indiana, most of them being observed about brush piles in a clearing, and along fences in the immediate vicinity. In the early part of June, 1871, a pair were seen in a thicket along the border of Fox Prairie, in Richland Co., Illinois, and it was presumed at the time that they were breeding there, but they may have been merely late migrants. It is known to breed in mountainous portions of Pennsylvania, New England, New York, Michigan, Minnesota, and eastern Nebraska, northward. It has been found nesting in Illinois south of latitude 39. Its nest is built on or near the ground in woods. One discovered by Burroughs in the state of New York was built in ferns about a foot from the ground, on the edge of a hemlock wood. It contained three eggs. The nests are usually composed of fine strips of bark and other fibrous material, lined with fine hair. The eggs are white, with a sprinkling of reddish dots near the larger ends.

The feeling that all life is one life slumbers in the child's soul. Only very gradually, however, can this slumbering feeling be transfigured into a waking consciousness. Slowly, through a sympathetic study of nature and of human life, through a growing sense of the soul and meaning of all natural facts and of all human relationships, and through recreating in various forms that external world which is but the objective expression of his own inmost being, the individual attains to a consciousness and unity of life and to a vision of the Eternal Fountain of Life. —*The Nest.*

THE RAVEN AND THE DOVE.

ELANORA KINSLEY MARBLE.

"YEA, master," croaked the raven, "I understand," and spreading his sable wings over the waste of waters he flew, anxious, as was Noah, for a sight of dry land.

The day passed, evening fell, and the raven had not returned.

"An ill-omened bird," gloomily said Shem, "so black and uncanny looking. His croak, even, hath to mine ear an evil sound."

"What thou sayest is true, brother," returned Ham. "Verily the raven hath a wicked look. A bird of more cheerful aspect, it seemeth to me, might well have been chosen. The albatross, so majestic, with powers of flight excelling all other creatures of the air; the eagle, or better still the stormy petrel, so light of body, its webbed feet enabling it, with expanding wing, to rest at will upon the face of the waters."

"Coo-o-o," came a low, plaintive call from a far corner. "Coo-o-o."

"Ah, my turtle dove," responded Japheth, "so loving, so true! Had the choice of a messenger been left to me, my brothers, verily would I have chosen the dove. Naught but death would have kept it, believe me, from its mate and us."

Noah turned from the window and gazed sternly upon his three sons.

"What signifieth the complexion of bird, beast, or man," he demanded gravely, "when one standeth in need of courage, intelligence, strength? Among all the winged creatures of the air within the ark, canst thou name one with instinct more subtle than the raven's? Black and uncanny looking, forsooth! Witness his speech, I tell thee," decisively, "the bird hath understanding."

As Noah ceased speaking, there came a low, faint tapping at the window. With a glad countenance he hastened to open it, and in flew the raven, quite exhausted.

"Water, water, everywhere," croaked the bird, and after wearily eating the food Noah gave him, tucked his head beneath his wing and was soon fast asleep.

Upon the morning of the next day, Noah again sent the raven forth, also the next, and the next.

"Water, water, everywhere," croaked the raven, as before, upon his return, and after wearily eating of the food which Noah gave him, tucked his head beneath his wing and was soon fast asleep.

"Verily," sneered Ham, who with his brothers had grown very impatient, "the sable-plumaged bird which thou dost insist upon sending forth daily, knoweth naught, to my mind, but the words which he so glibly speaketh. Surely he hath heard them uttered an hundred times."

Noah reflected. "What thou sayest, my son, may be true," he responded, "for of a surety when gazing from the window these many, many months, those words of our speech have been the daily burden. To-morrow, then," his gaze fixed upon the stormy petrel, "we will send forth——"

"Coo-o-o" came a plaintive call from the corner. "Coo-o-o."

"The dove," finished Noah, thoughtfully, "for verily it doth seem to answer me. Though devoid of speech, its affectionate nature may yet prompt it to devise some way by which its message may be interpreted."

And so upon the morning of the next day Noah opened the window of the ark and, the dove, poising upon his finger, spread her beautiful wings and over the waste of waters took her joyful flight.

The day passed, evening fell, and the dove had not returned.

A dark frown was settling upon the brow of Ham, when a faint tapping was heard at the window.

"Water, water, everywhere," croaked the raven, maliciously, as Noah hastened to open it and draw the exhausted bird within. "Water, water, everywhere."

"Verily, oh, raven!" despondently said Noah, "it doth appear that the dove, not more than thou, didst find a place for the sole of her foot. I will wait yet another seven days," he added thoughtfully, "ere I send her forth again."

And Noah waited seven days, and on the morning of the eighth he sent the dove forth again in quest of dry land.

The day passed, but ere evening fell the bird returned, bearing in her bill, as a token that the waters had abated, a freshly-plucked olive leaf.

"Thou art God's own messenger," joyfully said Noah, tenderly caressing the dove. "Verily something more than instinct guided and prompted thee in thy flight this day."

And Noah waited yet another seven days ere he again sent forth the dove.

This time, to the ark, the dove returned no more.

"Coo-o-o," more plaintively than usual, called her mate the next morning. "Co-o-o-o."

"He mourns for his lost love," pityingly said Japheth, the youngest son. "Verily, something hath befallen the bird!"

"Nay," responded Noah, "liberty is sweet. After long captivity in a dark, close house-boat, freedom might well try the fidelity of e'en a turtle dove. She awaits his coming, perchance, in the nearest pine or willow tree. Open then the window and let him forth."

And Japheth did as his father commanded, but sorrowfully, for it chanced that in close companionship, lo, these many days, with these innocent children of nature, Japheth had come to acquire a tender love and care for both beast and bird.

"Go, thou mourning dove," he said, unconsciously bestowing a fitting name upon the gentle bird. "Go!" And, spreading his beautiful wings, off the dove joyfully flew, following with unerring instinct the path in the air yesterday taken by his mate.

And yet a few days and Noah removed the covering from the ark and looked, and behold, the face of the ground was dry.

THE MAYFLOWERS.

(The trailing arbutus, or Mayflower, grows abundantly in the vicinity of Plymouth, and was the first flower that greeted the Pilgrims after their fearful winter.)

Sad Mayflower! watched by winter stars
And nursed by winter gales,
With petals of the sleeted spars
And leaves of frozen sails!

What had she in those dreary hours,
Within her ice-rimmed bay,
In common with the wild-wood flowers,
The first sweet smiles of May?

Yet, "God be praised!" the Pilgrim said,
Who saw the blossoms peer
Above the brown leaves, dry and dead,
"Behold our Mayflower here!"

"God wills it: here our rest shall be,
Our years of wandering o'er,
For us the Mayflower of the sea
Shall spread her sails no more."

O sacred flowers of faith and hope,
As sweetly now as then
Ye bloom on many a birchen slope,
In many a pine-dark glen.

Behind the sea-wall's rugged length,
Unchanged, your leaves unfold,
Like love behind the manly strength
Of the brave hearts of old.

So live the fathers in their sons,
Their sturdy faith be ours,
And ours the love that overruns
Its rocky strength with flowers.

The Pilgrim's wild and wintry day
Its shadows round us draws;
The Mayflower of his stormy bay,
Our Freedom's struggling cause.

But warmer suns ere long shall bring
To life the frozen sod;
And through dead leaves of hope shall spring
Afresh the flowers of God!

—*Whittier.*

THE CHESTNUT-SIDED WARBLER.

(*Dendroica pennsylvanica.*)

LYNDS JONES.

FOR one reason or another we come to think of this or that bird as an exquisite. This may be due to color pattern, form, carriage or song, but whatever it be, the bird's presence adds color and beauty to all our surroundings. It is not easy to tell why the chestnut-sided warbler impresses me as an exquisite. His colors are not so bright, nor their pattern in either the contrast or harmony that may be found with other warblers, but there seems to be something about the bird that makes the day brighter, the wearing field-work easier, and hours of fasting forgotten when he flits into view. I have sometimes half suspected that he was more than half conscious of my admiration from the manner in which he displayed his pretty colors and trim form. But no doubt this is base slander. The slightly opened wings, spread tail, and quick movements give an alertness to the little fellow which adds to his otherwise bright appearance. The females and fall birds lack the distinct contrasts of color found in the male in his spring dress, but they usually have some trace of the chestnut on the side of the body, which, with the small size, will serve to distinguish them from all others.

The tree-tops seem to possess few attractions for this warbler, but in village parks he may often be found well up among the branches gleaning from the buds and new leaves for insects and their eggs. In the woods he gleans much nearer the ground, but I have never seen him upon the ground searching among the fallen leaves. Many times he may be found among the low underbrush, preferably not at the edge of the woods, but usually a few rods in. He seems rather partial to damp woods, but may often be found among the uplands as well, where insect life is abundant.

The song is uttered while feeding, the bird seldom arresting his search for food, but turning his head this way and that scanning each leaf and stem. It is often a less spirited song than that of many other warblers, seeming to be a sort of soliloquizing accompaniment to the pressing duties of sustaining life, but it is none the less a pleasing song. There is a somewhat close resemblance to some phrases of the yellow warbler's song in the rendering of the chestnut-side, but a little attention and a discriminating ear will readily distinguish the difference both in quality and in quantity. The song is more often heard on the college campus here than in the woods, and there it sounds something like this: "*Wee-chee wee-chee wee-chee-e-e-e,*" with the accent on the first syllable of each phrase. This, in common with other warbler songs, cannot be well represented by a whistle, but rather by hissing or whispering the syllables between the closed teeth. The pitch is too high for my whistle. In the woods a common form of the song is, "*te te te te wee chu;*" and occasionally, "*to wee to wee to wee tee e-e-e.*" In the woods the song seems to be far more spirited than in the village, as well as being different. This difference may be rather due to the fact that the first migrants are those that visit the village, while the later ones are found in the woods. It is well known that with many of the warblers the first singers, or at least the first songs heard, are often different from the later ones.

In the vicinity of Oberlin, Ohio, this little warbler makes his appearance about the fifth of May and does not leave for the north until the last week of May. It can not be called common at any time, some years not being seen at all, but may usually be found in the shrubbery fringing woods, or in the shade trees in the village. None have been found during the summer months, and it is doubtful if any remain to nest. The winter is spent in the Bahamas and Mexico, and from there southward. The species ranges north to Manitoba, Ontario, and Newfoundland, and west

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CHESTNUT-SIDED WARBLER.
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to the plains, being a bird of eastern North America. It breeds from New Jersey and Illinois northward. I once found it breeding in central Iowa.

The nest resembles that of the yellow warbler, both in situation and composition. It is usually placed in the fork of a bush or shrub from two to eight or nine feet from the ground, made of the fibrous bark of the milk-weed, or some other hempen material, grass and sometimes leaves, lined with some sort of plant down and long hairs. The bark fibers are wound about the bush twigs, securely lashing the nest into the crotch. The four or five eggs are of a creamy-white color, with a wreath of reddish and dark brown spots and dots around the larger end, the spots becoming smaller and less numerous both ways from this wreath. They average about .66 x .50 of an inch.

In the fall they are among the first warblers to appear, often being seen early in August, and continuing in the region for several weeks. At this time of year their bright colors are wanting, but they are the same birds for all that, and may be readily recognized by their trim form and animated carriage.

NATURE STUDY—HOW A NATURALIST IS TRAINED.

SOME VIEWS OF JOHN BURROUGHS.

THE knowledge of nature that comes easy, that comes through familiarity with her, as through fishing, hunting, nutting, walking, farming—that is the kind that reaches and affects the character and becomes a grown part of us. We absorb this as we absorb the air, and it gets into our blood. Fresh, vital knowledge is one thing; the desiccated fact is another. Do we know the wild flower when we have analyzed it and pressed it, or made a drawing of it? Of course this is one kind of knowledge and is suited to certain minds; but if we cannot supplement it with the other kind, the knowledge that comes through the heart and the emotions, we are poor indeed.

I recently had a letter from the principal of a New England high school putting some questions to me touching these very matters: Do children love nature? How shall we instil this love into them? How and when did I myself acquire my love for her? etc. In reply I said: The child, in my opinion, does not consciously love nature; it is curious about things; about everything; its instincts lead it forth into the fields and woods; it browses around; it gathers flowers; they are pretty; it stores up impressions. Boys go forth into nature more as savages; they are predaceous, seeking whom they may devour; they gather roots, nuts, wild fruit, berries, eggs, etc. At least this was my case. I hunted, I fished, I browsed, I wandered with a vague longing in the woods, I trapped, I went cooning at night, I made ponds in the little streams, I boiled sap in the maple-woods in spring, I went to sleep under the trees in summer, I caught birds on their nests, I watched for the little frogs in the marshes, etc. One keen pleasure which I remember was to take off my shoes and stockings when the roads got dry in late April or early May, and run up and down the road until I was tired, usually in the warm twilight. I was not conscious of any love for nature, as such, till my mind was brought in contact with literature. Then I discovered that I, too, loved nature, and had a whole world of impressions stored up in my subconscious self upon which to draw. I found I knew about the birds, the animals, the seasons, the trees, the flowers, and that these things have become almost a grown part of me. I have been drawing upon the reservoir of youthful impressions ever since.

If nature is to be a resource in a man's life, one's relation to her must not be too exact and formal, but more that of a lover and friend. I should not try directly to teach young people to love nature so much as I should aim to bring nature and them together, and let an understanding and intimacy spring up between them.—*The Outlook.*

JOHN'S HAWK.

EMMA YARNALL ROSS.

JOHN came home one evening from a ramble in the country with a peach-box under his arm. He set the box very carefully on the back porch and then sat down himself on the top of the box.

His mother was watering some geraniums in a bed near by and paused in her work to look at the lad.

"Where did you get those peaches, John?" she asked, coming toward him with a pleasant smile.

John gave a low laugh. "This is a peach *box*, mother," he said, "but if what is in it is a *peach*, it belongs to a new variety, I think. Look at him, he is a beauty!"

"John Bonham, I hope you have not brought another pet to this house! Where in the world are we to stow away all these creatures on one little town lot? There is your groundhog, your owl, the crow, the coot, the tub of fish, the big dog, the little dog, and three Christopher Columbus cats."

"Now, mother, please stop; poor Chuck stays most of the time in his hole under the corner of the house, and the owl keeps the mice out of the cellar, and Jim Crow has not stolen anything for a month except that half dollar and your piece of lace and sister's red ribbon. You said I might have the wash boiler to make a swimming-pool for the coot, and I am going to feed the fish to him, so they will soon be gone and you can have your tub again. I heard you tell Mrs. Bland that our dogs guarded the whole neighborhood from burglars, and my Christopher Columbus cats are cute enough for anyone to be glad to have them. Mrs. Goodall says she 'wants one of them real bad.' You see, mother," said John, persuasively, "this fellow was such a beauty I just had to bring him home. Jake Timmons shot him through the wing as he was carrying off a dove; he was going to wring the hawk's head off, but I told him I would give him ten cents for it, for I wanted to try an experiment with the bird. I know I can tame him and make a pet of him; see, he can move around even if his wing is broken."

John's mother looked through the bars of the peach crate and saw a full-grown hawk with a beautiful brown head, eyes with blood-red rims, a strong, hooked beak, and long talons which he struck angrily into the stick John thrust at him through the bars.

"I never saw a more fierce, cruel-looking bird," she said. "See him tear at that stick! He will be tearing you next."

"I shall give him no chance to tear me, mother, for I intend to tame him."

"You might as well try to tame a tiger."

"Well, I am going to try taming him," said John, in a low, determined tone. When his mother heard him speak in that way she knew his mind was made up to succeed, and he had never yet failed in taming any of his pets.

John put the hawk in his dog-house, the front of which was formed of strong iron bars, and the next day his mother saw him sitting before this improvised bird-cage, going through some fantastic motions with his hands and gently chirping to the bird. No accident happened to the young naturalist in his care of the hawk, and gradually his mother ceased to think of it.

One afternoon, about three weeks after this, the family were seated on the piazza when they were startled at seeing John come around the corner of the house bearing the hawk on his wrist. Over the bird's head was drawn a gay-colored hood adorned with tiny bells and tassels—John had read how hawks were dressed in medieval times, and had made the hood himself. A long string was tied to one of the hawk's legs, and, setting the bird down gently, the boy tied the string to a small tree. All were watching him to see what he would do next, and all kept silence as he lifted a warning hand and

uttered a low "H-u-s-h!" He then removed the hood from the bird's head, when it immediately began tearing at the string, snapping viciously at objects near it, and running to and fro in an excited and angry manner.

John seated himself on the ground before the bird and began clucking to it softly, with the index finger of his right hand extended and pointing straight at the bird's eyes; then he turned quietly in whichever direction the bird moved, slowly waving his hand round and round in a circle and never taking his eyes off the bird's eyes.

Gradually the hawk ceased to run about, then stood still gazing steadily, as though fascinated, at John's finger. It would shut its eyes slowly, then open them suddenly, only to shut them again more slowly than before. At first the bird stood perfectly erect; then its head began gradually falling over on its shoulder, and, without any warning, it tumbled backwards, its eyes shut, its legs sticking straight up in the air, its body perfectly rigid. John continued for a time to wave his hand in a circle with the index finger extended; then he walked over to the porch leaving the hawk on the ground, where he lay for nearly thirty minutes, when he gradually returned to consciousness.

A number of persons walking by had stopped in the street to look at John and the bird, and now exclamations of surprise were heard as they saw the actions of the hawk.

"What did you do to that bird?" asked a gentleman of John; "I never in my life witnessed so strange a performance."

"I call that hypnotism," said the lad. "I have been working with him every day since I brought him home, and for a week I have never failed to bring him under my influence and put him to sleep in this way. If I go to the cage to feed him, he flies at me in a great rage at first, but if I pass my finger in a circle before him several times he becomes quiet, and will take a mouse from my hand without biting or tearing me with his talons. Sometimes I partly hypnotize him and lay the mouse at his feet, and although he may be very hungry he will not touch the food until I let him out from under the influence of my finger. When he is over being hypnotized he is as fierce as he was when I brought him home, and I do not believe he can ever be made tame like other birds. Perhaps if I had captured him when he was young, with the down still on him, I could have tamed him, but now he is too old and fierce."

"Well, my lad," said one of the men, laughing, "if he is not tamed you have him pretty well under your thumb and finger at least."

John's wonderful hypnotic influence over the hawk was soon known throughout the town and crowds of people often gathered to see him go through this truly wonderful feat of hypnotizing the fierce hawk.

The hawk belongs to the family of the *Falconidæ*, which is so called from the Latin word *falcis*, meaning a scythe, the talons of the *Falconidæ* being curved in the form of a scythe, thus giving the name to the species.

The wings of the hawk are so short they do not extend to the tip of the tail, for which reason it is called an ignoble bird of prey, to distinguish it from the true falcon, the wings of which extend to the tip of the tail and which is called a noble bird of prey. The hawk's bill is short, curved from the base, often terminating in a sharp point called a tooth. They have rather short, exceedingly strong legs and long incurved talons with which they tear their prey.

The species are numerous and widely distributed over the world; the goshawk and the sparrowhawk are the best known and most important. The hawk is a diurnal bird of prey, which means that it hunts in the day time. It flies with exceeding swiftness, having been known to travel a distance of 1,350 miles in twenty-four hours.

The hawk has very acute vision; hence the expression, "Keen-eyed as a hawk." It soars to a great height, always endeavoring to get above the bird it is pursuing in order to swoop down upon it from above. It soars in a series of arcs and against the wind, which helps it to rise as it does a kite.

The hawk does not attack its prey with its beak, as is generally supposed, but with its talons. After securing its prey by swooping on it and fastening its claws in its victim it gently descends to the ground.

The young hawk yet in the nest is called an eyas, one that can hop is a brancher, and a young hawk able to catch game is called a soar hawk. Young hawks taken in flying are called passage hawks, and the training of these is called reclaiming.

Hawking was for many years a sport followed by kings and the nobility in Europe. It is of very ancient origin, having been followed in Asia and Europe before the time of the Christian era.

The hawk builds its nest in the forks of a tree or on some inaccessible cliff. The female is larger than the male and lays two or three eggs.

CURIOUS TREES.

1. In Malabar, a tree called "the tallow tree" grows; from the seeds of it, when boiled, is procured a firm tallow which makes excellent candles.

2. The "butter tree" was discovered by Park in the central part of Africa; from its kernel is produced a nice butter which will keep a year.

3. The *palo de vaca*, or "cow tree," grows on rocks in Venezuela, South America. It has dry and leathery leaves, and from incisions made in its trunk a kind of milk oozes out, which is tolerably thick and of an agreeable balmy smell. At sunrise, the natives may be seen hastening from all quarters furnished with large bowls to receive the milk.

4. A tree of Madagascar, called the "traveler's tree," yields a copious supply of fresh water from its leaves, very grateful to the traveler. It grows in the most arid countries, and is another proof of the tender care of our Heavenly Father in supplying all His creatures' wants. Even in the driest weather a quart of water can be obtained by piercing a hole at the bottom of the leaf stalk, and the liquid is pure and pleasant to the taste. The leaves are of enormous size, varying from ten to fifteen feet in length.

5. The date tree is a species of palm, and almost every part of it is valuable. Its fruit is delicious and it is also esteemed for the palm wine drawn from its trunk. Its leaves are made into hats, baskets, fans, and many other articles, and the fibres of the leaf stems are made into cord and twine. A department store might almost be furnished from this tree.

6. The "sorrowful tree" is found on the island of Goa, near Bombay. It is so called because it flourishes in the night. At sunset no flowers are to be seen, but soon after it is covered with them. They close up or drop off as the sun rises. It has a fragrant odor, and blossoms at night the year round.

7. There is a tree in Jamaica called the "life tree," whose leaves grow even when severed from the plant. It is impossible to kill it save by fire.—*Normal Instructor.*

FROM COL. F. M. WOODRUFF.

6-99

CHICAGO COLORTYPE CO., CHIC. & NEW YORK

BLACK-THROATED BLUE WARBLER.

Life size

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NATURE STUDY PUB. CO., CHICAGO.

THE BLACK-THROATED BLUE WARBLER.

(*Dendroica cærulescens.*)

LYNDS JONES.

THE bird-lover has many red-letter days in his calendar, particularly when the birds are moving northward. The earliest arrivals, while snow still covers the ground, give their own peculiar thrill of delight, and waken in him new energy and great anticipations for the coming season of bird study. But these early arrivals soon become a part of the landscape and cease to lend any peculiar delight. Not so with the host of warblers, for they are here one day and may be up and away the next, not to be seen again for two or three months or even a year. One must be on the alert during warbler time if he expects to catch a glimpse of the passing host. But there are distinctively "warbler days" during this warbler time. These vary in different years with the weather and the advance of vegetation, from late April to the second or even third week of May, in northern Ohio and central Iowa, and proportionately later or earlier north or south of that latitude.

The subject of our sketch is not among the early migrating warblers nor yet among the later ones. He usually travels with the second large flight, and may then be expected late in April or early in May. The earliest Oberlin, Ohio, record falls on April 27, 1896, and the latest on May 10, 1897. Whether the birds arrive early or late they usually remain in the vicinity two weeks, the males being present during the first week and the females during the second. I have never found the two sexes present on the same date. The species cannot be said to be common even during the height of the spring migration, nor yet are they rare. Few are seen during the fall migration at Oberlin, and they during the last week of September and the first week of October. Further west in the Mississippi valley the fall migrants seem greatly to outnumber those of spring.

This is not a tree-top inhabiting species, but seems to prefer the middle branches of the trees or the tops of shrubbery, often descending to the ground and gleaning there much after the fashion of the Maryland Yellow-throat. In the higher woods free from underbrush he seems to prefer ground gleaning, but where low underbrush affords a place for low gleaning he is seldom seen on the ground. In village parks he is found of a much higher perch, and must be looked for there well up in the trees, even to the topmost branches, where he gleans among the bursting buds and new leaves. On the Oberlin College campus he is a regular spring visitor in early May, and here seems to appreciate his environment and rare opportunities, for he sings his best to the accompaniment of the medley of pianos in the Conservatory of Music across the way, and the deeper tones of the great pipe organ in the chapel hard by. Here I have heard him singing at all hours of the day, while in the woods his song is less often given. One is at a loss to assign a reason for the decided preference for the college campus, which is in the center of the village activities. Rumbling wagons and tramping feet cause the birds not the slightest alarm, but swiftly moving bicycles act upon the bird's nervous system much as upon that of an elderly woman.

The song of this warbler is variously rendered by the various writers upon bird songs. None of these renderings seems to describe the song as I hear it on the college campus. It is singing as I write: "*Tu euu euu e-e-e-e-e!*" A variation sounds, "*C'weu, c'weu, c'wee-e-e-e;*" sometimes "*c'weu, c'weu, c'w', c'w', c'wee-ee-e-e-e.*" There is also often a single phrase which sounds more like a scolding note than a song. It is: "*Tw', tw', tw', tw', twee'e-e-e-e-e,*" or even "*Z-z-e-e-e-e,*" rarely it may sound simply "*Z-z-z-z-z-z.*" The song

is uttered in a spirited manner while the bird is feeding and flitting about in the foliage, it interfering with the feeding only as a sort of after-thought, causing a momentary pause as the bird raises his head and straightens his body for the effort. It is one of the warbler songs that are easily recognized and not readily forgotten.

Were it not for the white spot or patch on the wing of both male and female at all seasons of the year and in all plumages, this warbler would easily escape the notice of all but the alert ornithologist. His black throat and breast, white belly and blue back and wings and tail are not conspicuous in the trees and foliage.

The black-throated blue warbler spends the winter months in Guatemala and the West Indies, and migrates north to Labrador and Hudson's Bay, nesting there and in the northern parts of the United States. It ranges west to the border of the plains.

The nest is placed in low shrubs or bushes from a few inches to two feet above the ground, and is composed of dry fibrous bark, twigs, and roots, lined with black rootlets and hair. The outside is often more or less covered with cocoons. The thick swampy woods with an undergrowth seems to be the favorite resort for the nesting birds. The four eggs are buffy-white to greenish-white, rather heavily blotched with varying shades of brown. They average about .69 x .50 of an inch.

THE EMPEROR'S BIRD'S NEST.

Once the Emperor Charles of Spain,
With his swarthy, grave commanders—
I forget in what campaign—
Long besieged, in mud and rain,
Some old frontier town of Flanders.

Up and down the dreary camp,
In great boots of Spanish leather,
Striding with a measured tramp,
These Hidalgos, dull and damp,
Cursed the Frenchmen, cursed the weather.

Thus, as to and fro they went,
Over upland and through hollow,
Giving their impatience vent,
Perched upon the Emperor's tent,
In her nest, they spied a swallow.

Yes, it was a swallow's nest,
Built of clay and hair of horses,
Mane or tail, or dragoon's crest,
Found on hedge-rows east and west,
After skirmish of the forces.

Then an old Hidalgo said,
As he twirled his gray mustachio,
"Sure this swallow overhead
Thinks the Emperor's tent a shed,
And the Emperor but a *macho!*"

Hearing his imperial name
Coupled with those words of malice,
Half in anger, half in shame,
Forth the great campaigner came
Slowly from his canvas palace.

"Let no hand the bird molest,"
Said he solemnly, "nor hurt her!"
Adding then, by way of jest,
"Golondrina is my guest,
'Tis the wife of some deserter!"

Swift as bowstring speeds a shaft,
Through the camp was spread the rumor,
And the soldiers as they quaffed
Flemish beer at dinner, laughed
At the Emperor's pleasant humor.

So unharmed and unafraid,
Sat the swallow still and brooded,
Till the constant cannonade
Through the walls a breach had made
And the siege was thus concluded.

Then the army, elsewhere bent,
Struck its tents as if disbanding,
Only not the Emperor's tent,
For he ordered, ere he went,
Very curtly, "Leave it standing!"

So it stood there all alone,
Loosely flapping, torn and tattered,
Till the brood was fledged and flown,
Singing o'er those walls of stone
Which the cannon-shot had shattered.

—*Longfellow.*

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

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THE POINTER.

(*Canis familiaris—Sagax avicularius.*)

THERE is a wide difference of opinion among naturalists as to the stock from which our dogs of the present day came. Hallock says that some have it the wolf, others the jackal or fox, while not a few claim that the wild dog of India is the source from which sprang all the varieties. He maintains, however, that it cannot be declared with any degree of certainty what the parent stock was. Certain it is that to no one animal can the paternity of these useful races be credited, as they are so widely different in form, color, and characteristics, and man could never have developed and brought together such vast differences, opposite natures and shapes, as can be seen in domestic dogs, unless the original species were in possession of the rudiments. Neither could food, climate, nor any contrivance whatever so completely alter the nature, decrease the powers of scent, render the coat short, long, or curly, lengthen or shorten the limbs, unless separate types had furnished the material.

Ancient bas-relief and monumental delineations picture the dog as distinct in its characteristics thousands of years ago as at the present day, and fossil remains have been repeatedly discovered so little resembling either the wolf, jackal, or fox, and so different in type, as to be classified with the spaniel, terrier, hound, bulldog, pointer, and pug; and as we know these to be made dogs, or in other words hybrids, the species must have been fully as numerous as at the present time.

There are numerous species of wild dogs differing from one another almost as much as our own domestic animals of to-day. Granting that the spaniel, greyhound, and terrier sprang originally from the wolf, as some argue, why not point out first why the male dogs are so dissimilar? And again, why are the wolves of different countries unlike, and which species of wolf is the true and only one? Without wishing to conflict with the opinions of those so much more learned on the subject than ourselves, we would ask, would it not be much more reasonable to suppose, without positive proof, that the origin of the domestic dog can be referred to numerous aboriginal species, crossing with the wild varieties—as we know our dogs will frequently do, including the wolf, jackal, and the fox, if we like, climate assisting, and man aiding by judicious intermixing and breeding—until the present high standard of this useful animal has been reached?

It is noticeable that we have in America far more well-bred setters than pointers, and greater attention seems to have been paid in the last few years in procuring the former blood than the latter. This arises from the fact that the setter is the greater favorite of the two, and justly the choice of the sportsman when he desires a dog that will unflinchingly stand the rough-and-tumble nature of our shooting. Of the two, the point of the shorter-haired animal is far the more marked when on game, and the training once received by him is always retained, and on each returning season he enters the field to be depended upon, while the setter oftener has to be partially rebroken each year; and if not owned by a sportsman who shoots continually, becomes headstrong and unreliable.

"For the person whose business will not allow him to take his gun in hand but two or three times in the autumn," says an authority, "we advise by all

means that his dog should be the pointer; but for the one who takes advantage of the open season for different game from its beginning to its close, we recommend the setter as best able to bear continued work in all descriptions of cover."

The short hair of the pointer enables him to do work on the prairies while "chicken" shooting where water is seldom found, and which he can do without for a long time; but in New Jersey, Delaware, and Maryland, and in countries where the game invariably takes to the briery thickets on being started, the pointer is at a disadvantage, as it refuses to enter them.

The pointer originally is a cross of the Spanish dog with the greyhound, or foxhound, by which the delicacy of the nerves of the nose, to some extent, is diminished, and the body rendered more light and elegant. No dog has a higher step, sense of smell, or shows greater intelligence or docility. The principal reason that he becomes rigid, or points, by the scent of game, is from the extraordinary condition of his nervous system, acquired centuries ago and handed down by his ancestors. According to Hallock, a thoroughly broken pair of high-bred pointers are so obedient to the voice and gesture of their master and so well trained to act with each other, that a wave of the hand will separate them, one going to the right and the other to the left, so that they hunt the entire ground, crossing each other regularly in front of the sportsman as he walks forward. There is one matter that is generally overlooked in ranging with the pointer. If in early life you have taught him to retrieve, and a case occurs in the field where he has to cross a stream, as the dog returns with the bird, never tell him "down charge." His coat is so thin and his organization so delicate that he is sure to catch cold; therefore, by all means, allow him to run around a little.

Points for the show bench, as given by the *Fancier's Gazette*, are:

Head should be moderately long, narrowing from the skull; the skull not too prominent above the eyes, as this gives a heavy appearance; rather deep in the lip, but not any flaw, or very slight; nostrils open, with level jaw; eyes moderately bold; ears thin, set in to the head, just where the skull begins to recede at the sides of the head, hanging flat on the cheek; throwing the ears back so as to show the insides has a bad appearance, and too often indicates a cross; neck medium in proportion to head, and body rather inclined to be long, but not much so, thickening from the head to the set-in of the shoulders; no looseness of the throat skin; shoulders narrow at the meeting of the blade bones, with a great amount of muscle, long in the blades, set slanting, with arm of the leg strong and coming away straight, and elbow neither out nor in; the legs not great, heavy boned, but with a great amount of muscle; leg pressed straight to the foot, well-rounded, and symmetrical, with foot well rounded (this is the forelegs and feet); chest moderately deep, not over wide, but sufficiently wide and deep to give plenty of breathing-room; back level, wide in loins, deeply ribbed and with ribs carried well back; hips wide and full of muscle, not straight in the hock, but moderately bent; stifles full and well developed; the stern nearly straight, going off tapering to the point, set-in level with the back, carried straight, not above the level of back; symmetry and general appearance racy, and much beauty of form appears to the eye of a real pointer breeder and fancier. The weights considered best for different purposes are from fifty pounds to about sixty-five pounds. Coat short and glossy, but a deal here depends on condition.

POINTS IN JUDGING.

Head	25
Neck	10
Shoulders	15
Legs	10
Feet	10
Loins	10
Stifles	5
Stern	15
	——100

Color and Coat.—The coat ought to be very short and soft, and fine, and the skin thin and flexible. Most people in England prefer the lemon-and-white to liver-and-white, or black-and-white.

THE PSYCHOLOGY OF BIRD STUDY.

IT is of advantage to know why a given occupation is profitable, why it is attractive or otherwise, to what sort of minds it is best adapted, and how it should be conducted to yield the best returns.

Other things being equal, the mind acts most healthfully on what is most pleasing. Children are attracted most by things having life, character, color, and rarity. Whatever has life appeals directly to the young mind, especially where the various stages of life are apparent. Birth, infancy, the family relation, society, paternity, sickness, death, joy, sadness, homes, building of nests, eggs, incubation, flying, singing, fighting, foraging, searching covert places, digging, boring, hammering, wading, swimming, catching, devouring, sentry duty, migration, gregariousness, dress, differences in appearance of sexes and ages, moulting, mimicking, special equipment for occupations, anatomy, physiology, hygiene, usefulness to man, assistance in agriculture and arboriculture, destructiveness to noxious life, swiftness, deliberation, expertness, stupidity, instincts for remarkable performances, lack of judgment in certain lines, loquacity, vivacity, sympathy and mutual helpfulness, resemblances to humanity and differences, and apparent moral sensibility, are among the leading features of birds in general which make them attractive to the youthful mind.

Where any of these subjects may be utilized in the ordinary instruction of children the results are more permanent and direct than where the same sort of instruction has been attempted with material that appeals less strenuously to the soul of the learner. That which arouses the most intense activity makes the most lasting impression. Even where the impression is a painful one the result endures; as in old England the memory of landmarks was impressed upon young boys by showing and flogging the boys at once. The unreasoning pain and the sight of the landmark remained forever associated. Modern research has found that pleasant sensation opens the mind and that attention is easily concentrated where inclination also leads. Whatever is discovered by the pupil while thoroughly aroused is of most lasting value. The ideas which school men have for centuries been trying to beat into the minds of children by senseless and dull repetition have been found to be easy of acquisition and in many instances matters almost of intuition if they may first be brought into the consciousness in a natural manner.

The instructor who has not the time nor the tact and invention needed to open the minds of his pupils first and then arrange matters so that self-directed activity will follow, will have a great deal of hard work before him if he hopes to compete with those who have found the secret of the mind's growth and act upon it intelligently. Such teaching cannot produce the results which are now being acquired in our best schools.

A whole system of education could be arranged with bird life as material for arousing and fixing the interest of the learner. But this is not our purpose. A whole system should take in all of the universe that is capable of interesting the learner. Our purpose is to take the most intensely absorbing field and show how it may be tilled.

Birds are used because so much more and better activity is to be secured by using them as the material for school work than from any other.

Why birds are so commanding to the growing mind will become clear to one who will patiently follow the thought in the remainder of this article. In avoiding technical terms the statement has been weakened, but it is believed that those who would enjoy the reading better if the terms were technical and closely accurate do not need to have the matter stated to them at all. Hence the statement is made in the terms of common speech with the object in mind of giving the reasons to those not much accustomed to the terms used by writers on psychological topics.

The mind is somewhat like the eye. It takes in whatever is before it. It is never concentrated upon one object alone, but has to occupy itself to some extent with the surroundings of the object. It is impossible to fix the mind, or the attention, exclusively upon one thing. We frequently ask our pupils to do this, but it is impossible. The mind at any one instant resembles the surface of a wave of water, part of what it carries is low, another part higher, and some other things are highest. But few things can be at or near the crest at once. Many things are around the base. As with the eye a few objects are at or near the focus, many things are where they are sensed but are not in the supreme position. And as the wave of water runs along its course so the mind moves forward. It will either run directly away from the subject or it will turn the subject over and carry it along in continually changing aspects. The mind cannot stand still. It cannot keep anything more than an instant except by turning the thing about and perceiving it in relation to other things. We still consider we have the thing in mind after we have ceased to think of it as a whole and pass on to thinking of its relations to other things.

The mind differs from the wave of water in that it is not extensive to the right and left of its course. It is like a hill with a small crest that can hold but few objects upon its surface. When we say we are thinking profoundly upon a subject we mean that that subject and its connections are continuously upon the crest of the wave, and that unrelated things are either not in the mind at all or they are at least not at the focus.

The things that are in the mind but not focal are continually striving, as if they were alive and very active to get at the focal point. Just as the eye is continually tempted to wander, making one object after another its focal one, so the mind is bound to travel unless it has been trained to turn from the thing to its relations and related things and from them back to the main thing again. That is the only way to pay attention. You cannot pay attention to one physical thing for more than an instant. But you can hold a chain of connected things running through the mind, but the things are continually modified by their relations and the absolutely same thing is never again in the mind. When it appears again it is clothed upon or enlarged or modified by what the mind has discovered about it and its relations or has invented and attached to it.

It is easy to repeat the multiplication table without having it focal in the mind. You may read half a page of print with your focal point upon some other matter. You may pray and find in your mind at the same moment a wicked thought. Worse than this, you may continue your prayer

and the wicked thought may become focal. Not by your desire that it shall be so, but by the power of marginal things in the mind which makes them focal without your apparent anticipation or desire to have them at the focus. You cannot say that the multiplication table is not in the mind when you are repeating it and wondering who will be at the party this evening. It is there but not focal. When you are reading the words of the page the words may be in your mind, but the focal point may be occupied at the time by wondering how the baby learned to climb so young and guessing whether you ought to catch her or run the risk of her falling, and if she should fall how much she would be injured, what the people would think of you for sitting there and letting her fall, why babies have to fall so much, whether they really learn much about slipping or center of gravity by falls so early in life, and a thousand other items in child study. But the reading is in your mind much as it used to be when your teacher said to you, "Now I want to see you keep your eyes on your book for fifteen minutes without looking off."

The mind grows at first by use of the senses. The sight is the main instrument of youthful mental growth. Things which can be seen or visually remembered are most appropriate subjects for juvenile thinking. You cannot well converse with children upon the pleasures of hope, the uses of adversity, nor any of the forms of mind stuff that are called abstractions. True, they like to play upon words and commit them to memory so as to reproduce them. But this is not because of the real meaning of the words committed but because the ear is pleased. Children enjoy talking like adults as well as looking and acting like them in their unstudied masquerades.

The proper material for juvenile mind action is what may be acquired by the senses. All those subjects in the second paragraph of this article are mainly appeals to the senses. These readily become focal in any mind, but chiefly in the mind that has never been trained away from the senses by abstract thinking. No child can pay attention to anything else when a bird flies in at the window. The bird and its act, its motive, its fellows, its appearance, its nest, its young, and a thousand other notions rush to the focus of his mind, no matter how diligently he may strive to keep them down. Instead of repressing in the mind what is naturally inclined to become focal, education is now finding out the value of permitting these things to come naturally into the mind and so operating upon them that mental growth ensues with little or no friction, and without asking the learner to flaggellate himself continually that he may have knowledge to use in that distant and half-believed-in time when he shall be a man.

Everyone knows that children are delighted with colored pictures. But there is an intensity of delight aroused by a certain class of colored pictures which has been a matter of surprise to most educators and parents since color photography has become practical for illustration. Infants in arms, who have never seen any birds except a few of the size of a canary, are so fascinated with the bird charts that psychologists have found a new problem presented.

If we look upon the child as he views an accurate colored picture we note that he is affected just the same as if the bird itself were before him. His imagination carries him beyond the picture to the thing itself, even in

the instances where he has never seen the bird nor any like it. As to his mental state, we can say that the bird rises directly to the focal point in his mind, and it is not the bird picture that holds him but the bird itself. For teaching purposes this is peculiarly fortunate, for the child is ready to grasp any suggestion from the teacher in order to enjoy the bird more at length. All the subjects of school work will ordinarily appeal to the child, rising readily into the focus of attention where the bird, its relations, its acts, and things pertaining to it, become the material for school activity.

This liveliness and readiness are not so manifest where mounted specimens are used, because the element of death becomes focal at the first instant, is displaced with difficulty, and continually recurs with sickening frequency during the exercise. The acts associated with the capture and death of the bird are too dangerously strong to be avoided. They should by no means be suggested.

Mr. Aima B. Morton puts it in this way: Why do children like colored pictures to abstraction? Because the child is father to the man. And what do we love more than tone and color, music and pictures? It is an inherent quality, the soul of life leading us back to nature, the All-mother. We have hung up pictures and maps of a poor quality before the class for years, and then lectured away at them *ad infinitum* and *ad nauseam*, thinking, because we understood, that the child also understood. But this is not so. We nearly always suppose too much, especially in lower grades.

Diesterweg said: "If you speak about a calf in the school room, bring it in and show it." This principle is still true to-day. All things in nature, as far as possible, should be present *in propria persona*. Where not possible, we must try to approach that ideal by bringing the very best, and natural pictures of the objects, that is colored ones, and the vivid imagination of the child does the rest. It does not see the picture, the object itself is there, nature has entered the school room.

So we learn that bird study, aided by color photographs, is psychologically the most valuable means to the attainment of school ends. It is attractive to the young mind because it furnishes material which rises most readily to the focal point in the mind. It relieves teacher and pupil of the strain attendant upon work where it is difficult to get the class to "pay attention." It is chiefly adapted to growing minds. No matter how strongly the matured mind with its powers of abstract thinking may be drawn toward it, it is yet more attractive to the mind that has not been trained to any sort of restraint. To get the best results, bird study should not be conducted with a view to storing the child's mind with scientific knowledge, nor for the sole purpose of employing it effectively to teach language and other branches of school effort. But it should be pursued as a mode of activity which developes mind, acknowledging the fortunate circumstance that school learning and bird knowledge will both be acquired at the same time, although they are not the direct objects of the pursuit.

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Shells kindly loaned by J. M. Wiers.

CHICAGO :
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SHELLS AND SHELL-FISH.

	Scientific Name.	*Common Name.*	*Named by*	*Where Found.*
No. 1.	Turbo Argyrostona.	Silver Mouth.	Linn.	Singapore.
No. 2.	Strombus Bitubereulata.	Kid Conch.		West Indian Islands.
No. 3.	Nerita Peleronta.	Bleeding Tooth.	Linn.	West Indies.
No. 4.	Strombus Urceus.		Linn.	Amboina.
No. 5.	Turbo Sarmaticus.	Turk's Cap.	Linn.	Algoa Bay.
No. 6.	Cypræa Argus.	Eyed Cowry.	Linn.	New Caledonia.
No. 7.	Helix Hæmastoina.	Red Mouth Snail.	Linn.	Ceylon.
No. 8.	Murex Pomum.		Smet.	Florida.
No. 9.	Oliva Inflata.		Linn.	Singapore.
No. 10.	Conus Arenatus.	Sandy Cone.	Hwass.	Red Sea.
No. 11.	Fascioloria Tulipa.		Linn.	West Indies.
No. 12.	Conus Leoninus.		Gmelin.	Florida.
No. 13.	Spondylus Pictorum.		Chem.	California.
No. 14..	Conus Literatus.	Lettered Cone.	Linn.	Ceylon.
No. 15.	Haliotis Iris.	Green Abalone.	Gmelin.	Japan.
No. 16.	Terebra Maculata.	Marlin Spike.	Linn.	Sandwich Islands.
No. 17.	Murex Regius.	Red Murex.	Wood.	Panama.
No. 18.	Oliva Porphyria.	Tent Shell.	Linn.	Panama.
No. 19.	Murex Bicolor.	Pink Murex.	Val.	Mexico.

WHO does not love the beauty of shells? Who, when visiting the sea-shore, has not sought them with eagerness? Their beautiful colors are pleasing to the sight.

The Indians have always loved shells on account of their bright colors. No doubt they many times tried to paint their faces the same color. They used to make money from the pink or purple portions of them.

There are thousands of different kinds of shells. To get the full beauty of them we must see them in their native homes amidst the sands and stones and the roaring sea.

Mr. Emerson tells of finding the "delicate shells on the shore," and how the fresh waves seemed to add new beauty to them. He wiped away the foam and the weeds and carried them home. He could not take the foam and waves and sky and ocean's roar. He says the shells

"Had left their beauty on the shore,
With the sun and the sand and the wild uproar."

Did you ever place a large shell to your ear and listen to its roar? It sounds like the distant roar of the sea. Mr. Wordsworth says:

"I have seen
A curious child, who dwelt upon a tract"
Of inland ground, applying to his ear
The convolutions of a smooth-lipped shell;
To which, in silence hushed, his very soul
Listened intensely; and his countenance soon
Brightened with joy, for from within were heard
Murmurings, whereby the monitor expressed
Mysterious union with its native sea."

We can not all go to the sea to study its wonders. So we will have to do the best we can studying pictures of shells, making collections of as many kinds as possible and studying about the animals that have lived in them.

Each shell, it matters not how small, has been the home of a living creature. Each has an interesting story for us if we will but read it.

Shell-fish have no bones as other fish have. They, therefore, need a solid house in which to live. The shells not only serve them for houses, but for bones to keep their pliable bodies in shape, for ships in which to sail, and for beautiful dresses, starched and shining.

If these soft animals had no solid shells they would immediately be eaten by other animals of the sea or dashed to death by the waves.

But it is not alone the beauty of shells that renders them interesting. Conchology, which treats of shells, is as a science at least as old as the days of Aristotle, the study of which was resumed, along with that of the other sciences, when the dark ages had passed away. Since the beginning of the nineteenth century it has given place to a more extended and comprehensive study of molluscous animals, the presence or absence of a shell having been found not to constitute one of the most important characteristics which distinguish different classes of mollusks. Conchology was only the form of the science suited to a time when the shell was more considered than its inhabitant. Yet it is claimed that the relations between shells and the mollusks which possess them are such that the labors of the merest conchologists have contributed to the real advancement of science, both zöological and geological.

Shells consist of carbonate of lime secreted by the animal and intermixed with some animal matter. In the species in which it is least developed it appears as a hollow plate, which serves as a protection to the breathing organ and heart. The protuberances and ridges seen on many univalve and bivalve shells appear in the course of their growth by the margin of the mantle, turning out at a considerable angle and thus building up a plate in this position for a certain distance. This growth then ceases, the mantle retracts, or may be regarded as changing itself into the shelly layers, and thus it extends in the original direction, carrying out the shell with it, till it turns again to form a second plate or ridge; and so the process goes on. Many mollusks possess the power of altering and enlarging their shells to adapt them to their growth, which they appear to do as if by an intelligent will.

The distinguishing marks of shells are the number of parts of which they are composed, and their peculiar forms and prominences. Some consist of a single piece, some of two pieces, and some of three. The textures of shells are described as pearl, fibrous, horny, and some are glassy and translucent. The pearly shells are in alternate layers of very thin albuminous membrane and carbonate of lime, which by their minute undulations give the pearly lustre. This structure is the least permanent and in some geological formations the shells that were provided with it have disappeared, leaving only their casts, while those of fibrous texture are preserved unchanged. Colors, however beautifully exhibited upon the surface of shells, are to them no more distinctive features than to the minerals and flowers upon which they are also prominently displayed. They are most richly developed upon those surfaces most exposed to the light and in the class of shells found in shallow waters.

The whole number of species of molluscous animals known is estimated at about twelve thousand recent and fifteen thousand fossil. Many of the living species furnish wholesome food, and some are esteemed as delicacies. The marine shells, by the immense numbers in which they are produced, perform an important office in abstracting from the sea-water its excess of calcareous matter and thus aid in maintaining its purity.

As objects of beauty, shells have always been admired and frequently been used as ornaments Some varieties were used by the Athenians as ballots, with the name upon them of the person to be banished, whence the term ostracism. Some shells have served the purpose of coin among rude nations. Others are noted for the pearls which are secreted between their valves around some foreign substances. Mother-of-pearl is the polished shell of nacreous. Rare species of shells are highly prized by collectors, and single specimens have been sold for large sums. The South Sea Islanders use the conch as an instrument of music, blowing into the shell through the broken top, thereby producing a loud and mellow sound. It is a species of sea conch which is represented by the god Triton. In many rural parts of the United States conchs are used in place of dinner bells or tin horns to call persons from a distance.

THE FLOWN BIRD.

R. H. STODDARD.

The maple leaves are whirled away,
  The depths of the great pines are stirred;
Night settles on the sullen day
  As in its nest the mountain bird.
My wandering feet go up and down,
And back and forth, from town to town,
Through the lone woods and by the sea,
To find the bird that fled from me.
I followed, and I follow yet,
I have forgotten to forget.

My heart goes back, but I go on,
  Through summer heat and winter snow;
Poor heart, we are no longer one,
  We are divided by our woe.
Go to the nest I built, and call,
She may be hiding after all,
The empty nest, if that remains,
And leave me in the long, long rains.
My sleeves with tears are always wet,
I have forgotten to forget.

Men know my story, but not me
  For such fidelity, they say,
Exists not—such a man as he
  Exists not in the world to-day.
If his light bird has flown the nest,
She is no worse than all the rest;
Constant they are not, only good
To bill and coo, and hatch the brood.
He has but one thing to regret,
He has forgotten to forget.

All day I see the ravens fly,
  I hear the sea-birds scream all night;
The moon goes up and down the sky,
  And the sun comes in ghostly light.
Leaves whirl, white flakes about me blow—
Are they spring blossoms or the snow?
Only my hair! Good-bye, my heart,
The time has come for us to part.
Be still, you will be happy yet,
For death remembers to forget!

FOREST PARK, SPRINGFIELD, MASS.

THIS is one of the most beautiful public parks in the United States. In his annual report, which is a handsomely printed and illustrated volume, President Marsh says that while there are few changes during the year in the make-up of the big family of birds and animals that compose the zoölogical and ornithological department, it continues to be an ever increasing source of pleasure to the thousands of persons who visit the park for recreation, and no part of the park is more thoroughly appreciated. The departure from the usual plan of park menageries in arranging an exhibit of domestic animals has been a marked success, giving to the park visitors a chance to become acquainted with the more common breeds of the higher types of our domestic animals, an education in which the average city resident is sadly lacking. The exhibit of thoroughbred cows has been especially a source of pleasure and instruction. The collection comprises seven thoroughbred cattle, no two of the same breed, and children and grown people alike take delight in visiting the barns to see these splendid animals, finding it as instructive as it is entertaining.

This is a departure that might be favorably considered by other boards of park commissioners. All of the domestic animals of superior breed might be annually exhibited with great advantage to the general public.

The ornithological and zoölogical exhibits of Forest Park are hardly surpassed anywhere, containing as they do one hundred and eighty-nine specimens of animals and three hundred and ninety-seven of birds.

MARBLES.

MR. GEO. D. MERRILL,
Head Curator, Department of Geology, U. S. National Museum.

THE origin of the name marble, like that of many another name now in common use, is somewhat obscure. By many authorities the word is supposed to have been somehow connected with the Greek word meaning "sparkle." However this may be, a sparkling appearance is by no means universal among marbles, but is limited to those which, like the white statuary or other crystalline varieties, have a granular structure, the sparkling itself being due to the reflection of light from the smooth surfaces of the constituent minerals. As used to-day, the word marble is made to include any lime rock of such color and hardness as to make it desirable for ornamental, or even the higher grades of building work. Stones of precisely the same composition and origin, which are not of the desired color, are classed simply as limestones.

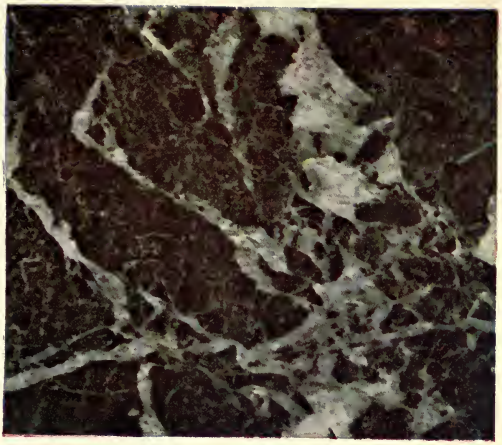
Accepting the definition given above, it follows, then, that with a few exceptions, to be noted later, marbles are but hardened and otherwise changed beds of marine sands and muds, containing, it may be, still recognizable fragments of the corals and mollusks of which they were originally composed. But inasmuch as these muds were rarely of pure carbonate of lime, but were contaminated with matter from seaweeds and animal remains, or by iron compounds, so the resultant marble is not always white, but, if containing matter from plants or animals, gray, blue gray, or even black; and if containing iron, buff, pink, or red. If the change in form of the original muds was just sufficient to produce crystallization, we may have a marble full of fossil remains which may be of a white or pink color, standing out in fine contrast with the darker ground. If, on the other hand, the change was complete, we may have a marble of small granules, pure white in color, and of a texture like loaf sugar, such as to render it suitable for statuary purposes.

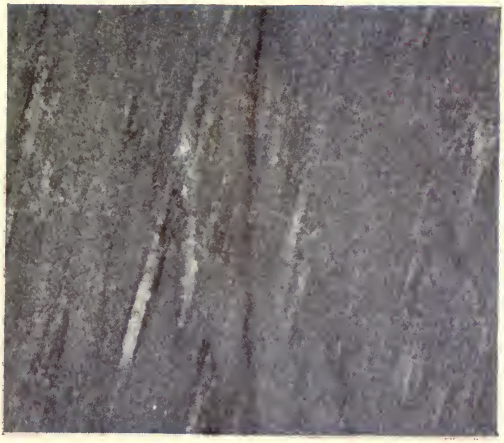
At one early period of the geological history of the North American continent, all that portion now occupied by the Appalachian mountain system was sea bottom, and on it was being deposited not merely sediments washed down from the land, but, in favorable localities, deposits of lime, sand, and mud. This deposit went on, on a gradually sinking floor, for long ages, until the lowermost beds were buried under thousands of feet of the later formed materials. Then began the slow uplifting of the sea-bottom in the form of long, parallel folds to form the mountain ranges. During this uplifting the lime sediments, which are the only ones we need consider here, were changed to marbles, and have since been exposed and made available to the quarriers through the wearing-down action of rain and running streams. So, then, a quarry is but an excavation in the hardened mud formed on the bottom of a very ancient sea.

In the Vermont marble region the beds are highly inclined and of varying colors. From the same quarry there may be produced pure white, gray, blue gray, and greenish varieties, often variously veined and blotched owing to the collection of their different impurities along certain lines. Some of these quarries have been worked a depth of two hundred feet and more.

Not all marble beds are upturned at this steep angle, however, nor have they been worked so deeply. In Georgia, the quarries are often in hillsides, extending scarcely at all, if any, below the surface of the ground. Where opened in the valley bottoms they have the form of huge rectangular pits, with perpendicular walls. In Tennessee, many of the sediments were so slightly changed that the fossil remains are still easily recognized, and the stone is of a pink or chocolate red color, owing to the abundance of iron.

The marbles are quarried mainly by channeling machines, which cut out the stone in blocks of any desired





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MARBLES.

OLD TENNESSEE.
SIENNA.
FLORENTINE VERMONT.

ALPS GREEN
MEXICAN ONYX.
AFRICAN MARBLE.

LAWRENC
Public Libra

size, or at least in sizes such as the nature of the beds will allow. Blasting is never resorted to in a properly managed quarry, since the shock of the explosion is likely to develop flaws in so tender a material. When freed from the quarry bed and brought to the surface the stone is sawn into the desired shapes by means of "reciprocating" blades of soft iron, the cutting material being sand, washed under the blades by small jets of water.

The use to which any particular marble is put is governed largely by its price and color, though texture or grain often are taken into consideration. The coarsely crystalline white and white clouded marbles of southern New York, Maryland, and Georgia, are used almost wholly for building purposes; the pink and variegated marbles of Tennessee for interiors and for furniture; while the white and blue-grays of Vermont find a large market for interiors, cemetery work, tiling, and, to a much smaller extent, for building.

It was stated before that not all our marbles were changed (metamorphosed) marine sediments. The exceptions are (1) the onyx marbles, which, though composed of carbonate of lime, like the last, are deposited from solution, and (2) the so-called verdantique marbles, which are mainly altered eruptive rocks. These last differ widely from those we have been describing, being of a prevailing green color, though often variegated with white or red. They are, in fact, not to be classed with the lime rocks at all. The names *verdantique*, *verte antique*, and *verde antique* are but varying forms of the same words, indicating a green antique marble. The term antique has been applied simply because stones of this type were used by the ancients, and particularly by the Romans.

The so-called onyx marbles are, as noted above, spring deposits, differing from ordinary lime deposits only in color and degree of compactness. The name has also been made to include the stalagmites and stalactites in caves, such as were used by the ancient Egyptians in the construction of alabastrons, amphoræ, funeral urns, and various household utensils. The material is translucent and often beautifully clouded and veined in amber, green, yellow, and red colors. Owing to its mode of origin it shows a beautiful wavy banding, or grain, like the lines of growth in the trunk of a tree when cut across the bedding. This fact, together with its translucency, has been the cause of the wrong use for it of the name onyx, which properly belongs to a banded variety of agate. Equally wrong and misleading is the name "oriental alabaster," which is commonly applied to the Egytian variety, the true alabaster being a variety of gypsum.

The larger part of our onyx marbles comes to-day from Mexico, though there are equally good materials of this type in Arizona and California.

The foreign supplies come in part from Egypt. Their use is almost wholly for interior decoration, as wainscotings, and the like, and for tops to small stands, bases for lamps, and so forth. These are by far the most expensive of all the stones to which the name marble is properly applied.

Some of the most noted of our foreign marbles are those of Carrara, Italy, which are ancient sediments thought to have been changed at the time of the uplifting which formed the Apennines. They are of white and blue-gray colors, sometimes beautifully veined. A beautiful, mellow yellow to drab variegated variety, very close in texture and almost waxy in appearance, is found near Siena, and is known as Siena marble. It is a great favorite for interior decorative work, as may be seen to advantage in the vestibule of the new public library building in Boston, and the rotunda of the National Library building at Washington.

Other marbles, which at the present time are great favorites with the architects, are the so-called Numidian marbles, from Algeria. These are of yellow, pink, and red color, and often beautifully mottled. Their textures are so close that they take a surface and polish almost like enamel. Since their first hardening these beds have been shattered like so much glass into

countless angular fragments, and then the whole mass, with scarcely any disturbance, once more cemented into firm rock. The result is such that when large blocks are sawn into slabs, and the slabs then polished and spread out, the same series of veins, of angular blocks and streaks of color, may be traced from slab to slab, even repeating themselves with only slight changes throughout the entire series.—*Nature and Art.*

THE WHIPPOORWILL.

MRS. MARY STRATNER.

A VALUED pet of ours is the whippoorwill or *Antrostomus vociferus*. When most of the other songsters have tucked their heads under their wings our whippoorwill wakes up to the business of the night.

First, he darts about catching insects and moths for his babies' breakfast—for this is their breakfast time—or if his babies are not hatched he takes the insects to the faithful mother-bird on the nest. After this is done he thinks his business cares are over, and he feels free to enjoy himself.

Our especial whippoorwill always selects the same spot, year after year, just about ten yards from our front door, in a clear white space on the shell-walk, and there, squatted on the ground and facing us as we sit on the piazza in the moonlight, he vociferously demands that we "whip poor Will." This demand he keeps up for a minute or two. Finding that we do not intend to heed his request, as our sturdy six-year-old Will objects, he commences a low muttering kind of grumbling.

Suddenly he has a new idea and he now orders us to "Chuck Will's widow! Chuck Will's widow!" but this order, too, goes unheeded, as our Will has no widow, and if he had why should we chuck her?

Now he does some more grumbling and finally flies away. We had almost forgotten him, when back he comes and squats in the same place. First he gives a low "Chuck, chuck;" then cries out shrilly, "You free Wheeler! You free Wheeler!" We know of no Wheeler who needs freeing, so again we cannot comply with his wishes.

Then, as if disgusted with our unresponsiveness, he flies up in a near-by orange tree where he laments somewhat like an Irishman: "O whirr-r, whirro! O whirr-r, whirro!"

He keeps this up so long that it causes some sleepy boy to say: "I wish that old bull-bat would be still." And sometimes the boy feels tempted to get up and drive him away, but he remembers in time that this feathered friend rids us of many obnoxious insects. For this reason the southern whippoorwill, or bull-bat, is protected by law in many of the states.

We know where *our* whippoorwill nests every year in May, and we often pay the mother-bird a visit in order to get a peep at her brown speckled eggs, and later at her two brown babies; but we never bother them, contenting ourselves with taking their picture with a kodak.

This last is very difficult to do, for mamma whippoorwill always selects a dense, shady part of the woods for her motherly duties. The nest is flat on the ground, generally under a palmetto leaf, which keeps off the rain. It is composed of dry leaves which seem to have been just scratched together, and is not noticeable unless the bird is there. Even then, the brown color of the bird blends with that of the ground and leaves, so that it takes sharp eyes to detect her.

When the young birds first leave the nest they sprawl about in a comical manner. When in repose they squat flat on the ground, with wings spread out to the fullest extent, and they keep up a rolling motion with their bodies from side to side, for all the world as if they wanted to roll over, but were prevented from doing so by the position of their large wings.

TWILIGHT BIRDS.

COLE YOUNG RICE.

Swallow, I follow
  Thy skimming
Over the sunset skies—
Follow till joy is dimming
To sadness in my eyes.
And hollow seems now thy twittering
High up where the bittering
Night-blown winds arise.

Throstle, the wassail
  Thou drinkest
Daily of chalice buds—
Wassail in which thou linkest
Thy notes of springtime moods—
Should docile thy elfish fluttering
Where twilight is uttering
Sorcery through the woods.

Plover, thou lover
  Of moorlands
Drained by the surfing sea—
Lover of marshy tourlands,
What is the world to thee?
Nay rover, wing on unquerying
O'er mallows ne'er wearying
Over the pebbly sands!

But sparrow, the care o'
  Thy nesting
Pierces thy vesper song—
Care o' the young thy breasting
Shall warm through the blue night long—
Till, an arrow, seems thy dittying,
Of pain to the pitying
Heart that knows earth's wrong.

AWESOME TREES.

WE made a side trip to the big trees of the Mariposa group, which are about one hour's ride from the hotel, says a correspondent of the Pittsburg *Dispatch*. If the smallest of these trees could be planted anywhere in Pennsylvania the railroads would run excursion trains to it and make money. The trees in this grove are so large that it takes a good while to fully appreciate the facts about the size of the biggest of them. The "Grizzly Giant" is thirty-four feet through at the base and over 400 feet high. This tree would overtop the spires on the Pittsburg cathedral by over 100 feet. The trunk of this tree is 100 feet clear to the first limb, which is twenty feet in circumference. Many other trees here are very nearly as large as this one, and there are 400 in the grove. Through several tunnels have been cut and a four-horse stage can go through these tunnels on the run and never graze a hub. You get an approach to an adequate idea of their size by walking off 100 yards or so while the stage is standing at the foot of a tree and glancing from top to bottom, keeping the stage in mind as a means of comparison. The stage and the horses look like the little tin outfit that Santa Claus brought you when you were a good little boy.

These trees are no longer to be called the largest in the world, however. A species of eucalyptus has been found in Australia as large or larger. Emerson warns us against the use of the superlative, but when you are in this region of the globe you can't get along without a liberal use of it. He himself says of Yosemite: "It is the only spot I have ever found that came up to the brag." And as I stood in the big tree grove I remembered that some one called Emerson himself "the Sequoia of the human race."

THE EDGE OF THE WOOD.

ELLA F. MOSBY.

THE ideal place for birds, says Mr. Frank Chapman, is the edge of the wood where field and forest meet, and a stream is not far off. If an orchard be in sight, so much the better. It was my delight to spend a summer, or part of it, in just such a spot not long ago, and I made many charming discoveries here. In the first place I learned that tt is by no means necessary for birds to "be of a feather" in order "to flock ogether." I came one bright morning on a flock of indigo buntings near the water's edge, the proud father, in exquisite blue, like finest silk, with shimmering lights of green playing over it, the mother in siena brown, and the babies, neither blue nor brown, but a sooty black, with only a solitary wee feather now and then to show the blue that was coming. What an odd, but what a pretty, happy little family!

The banks of the stream were thickly overgrown with milk-white elder, orange butterfly-weed, and a thousand feathery grasses and nodding leaf-sprays, already touched on edge with crimson or gold "thumb-marks." On the tall stalks swung the goldfinches, "a little yellow streak of laughter in the sun," and every stake or post in the fence near by made a "coigne of vantage" for the merry wrens to call and whistle. The calls of birds express, bird-fashion, every feeling that the heart of man knows—surprise, fear, joy, hope, love, hate, and sorrow. If we could only contrive to think *bird-thoughts*, as perhaps an Audubon may have done, or a Wilson, we might understand these strange signals and cries, often uttered by invisible speakers from a world above ours.

I learned at this time that the quails, or Bob-Whites, have many calls instead of the *one* from which they are named. There is the low, sweet mother-talk to the brood, the notes of warning, the "scatter calls" of autumn from the survivors of an attack, "*Where are you? Where are you?*" and a sort of duet between male and female at nesting time. When she leaves the nest, she calls *Lou-is-é!* and he strikes in on the last syllable with "*Bob;*" she repeats, and he bursts forth "*Bob White!*" with emphasis. Then the clear, ringing whistles through midsummer sound up and down the meadow from one quail to another. The old farmer interprets their colloquy thus:—

"Bob White, Bob White,
Pease ripe, pease ripe?"
"Not quite, not quite."

These birds are very tame during the spring and fall, and will come into town, on the edges of the streets, and call from roof and door-step without fear, sometimes even mounting into a tree close beside a window and whistling for an hour or two.

On the contrary, it is by the edge of the wood and after the brood is reared, that tree-top birds, like tanagers and cardinals, grow most friendly and fearless. Frequently, when I raised my glasses to look at some plain brown or gray bird, the scarlet of a tanager would flash across the field, and the rose glow of the cardinals appear in the grass. The female cardinal, with her lovely fawn tints and rose linings, and her beautiful voice, equals the male in interest. She is a bird of lively emotions, and being rebuffed by a catbird one day, made the lawn ring with her aggrieved cries, while her mate sought to comfort her most tenderly. They are not graceful on the ground, but they have a stout air of proprietorship that is not unpleasing. Both of our tanagers, the summer and scarlet, the cardinals, and the brilliant orioles, live together very peaceably, nor have I seen any sign of envy, malice, or spite among them. I suppose each one of us has his own Arcadia; mine—and that of these winged neighbors—assuredly lies at the boundary-line between shadowy forest and sunny meadow—at the edge of the wood!

ORES.

CHICAGO :
A. W. MUMFORD, PUBLISHER.

SPECIMENS AT TOP OF PAGE ARE GOLD BEARING ROCK.

SILVER QUARTZ. NATIVE COPPER. TIN ORE. B. H.

NICKEL PYRITES. LEAD CRYSTALS. BLUE CARBONATE COPPE

SPATHIC IRON ORE. KIDNEY IRON ORE. ZINC ORE. NEEDLE IRON ORE.

ORES.

NICKEL is a silver-white, ductile metal, discovered by Cronstedt in 1751. It is closely allied to iron and cobalt, and is associated with many ores. Nickel, according to Deville, is more tenacious than iron. It is magnetic at ordinary temperatures. Many of the copper coins of the European continent and the United States are alloys containing various proportions of nickel. Nickel-plating has become an industry of great importance in the United States. It is used for magnetic needles, for philosophical and surgical instruments, and in watch movements.

SPATHIC IRON ORE.—Carbonate of iron, when found in a comparatively pure and crystallized state, is known as spathic or sparry. In its purest form it contains 48 per cent. of iron. The ore is found near Hudson, N. Y., and in Tuscarawas county, Ohio.

COPPER.—Copper is one of the most anciently known metals, and its name is derived from the island of Cyprus, where it was first obtained by the Greeks. In the earlier times it does not appear to have been employed by itself, but always in admixture with other metals, principally tin, forming bronze. Great masses of native copper have been found both in North and South America.

TIN.—Tin is a beautiful silver-white metal, with a tinge of yellow. There was no tin produced in the United States in 1896. The tin-producing countries are Malacca, Banca, Bolivia, Australia, and Cornwall.

ZINC.—A metal of a brilliant white color, with a shade of blue, and appearing as if composed of plates adhering together. It is not brittle, but less malleable than copper, lead, or tin; when heated, however, it is malleable, and may be rolled into plates.

LEAD.—A metal of a dull white color, with a cast of blue. It is soft and easily fusible. It is found native in small masses, but generally mineralized by sulphur and sometimes by other substances. It is the least elastic and sonorous of all the metals.

YOUNG WILD BIRDS.

THE thickness of the foliage on the trees, the high vegetation of the cultivated land, and the natural tendency of young birds to keep quiet and still, make the study of them a matter of some difficulty. In the hedgerows and by the woodsides unfamiliar notes and calls of birds are constantly heard—the notes of young birds, which cannot be identified owing to the thickness of the foliage, and though in the large woods the cry of the young sparrow hawks and the flight of the pigeons and woodpeckers betray their presence, it is almost impossible to watch them, or to ascertain their way of procuring food. Probably most of the larger species are fed by the old birds long after they leave the nest.

Of game birds, young partridges are the most self-reliant, and young pheasants the least able to take care of themselves. The present writer has never seen young quails, but as those coveys which are hatched in England often number as many birds as the quail usually lay eggs, it may be presumed that these, the smallest of all the game birds, are not less active and precocious than the young of the partridge. The latter are almost as active upon land as young wild ducks are upon the water. They run swiftly and without hesitation, even among thick vegetation, when they are no bigger than a wren, and follow or precede their mother through mowing grass, hedgerows, or the sides of furze breaks and copses, seeking and catching insects all the while, and neither losing themselves nor betraying their whereabouts by unnecessary noise or excursions.

MANDIOCA.

ANNA R. HENDERSON.

MANDIOCA (*Jatropha Manihot L*) is the principal farinaceous production of Brazil, and is largely raised in nearly all parts of South America; in fact, is the main bread food of that continent, and is therefore worthy of consideration.

It is difficult for dwellers in northern climes to conceive of a land which does not look largely to fields of wheat or corn for sustentation; yet millions inhabit such a region, and strange to say, derive their bread from a root which combines nutritious and poisonous qualities.

Mandioca is indigenous to Brazil, and the Indians, strange to say, discovered methods of separating its nutritive and detrimental qualities. The Portuguese, learning its use from them, invented mills for its preparation, and it became the bread food of a great tropical region where wheat and Indian corn do not thrive.

The plant has a fibrous stalk, three or four feet high, with a few branches and but little foliage; light-green five-fingered leaves. The roots are brown tubers, often several inches thick, and more than a foot in length.

It is planted from slices of the tubers and is of slow growth, taking eighteen months to mature. The poisonous quality is confined to the juice of the roots, and even this may be rendered innocent by boiling. It then becomes vinegar by fermentation. The leaves may be eaten by cattle. The roots must be ground soon after digging, as they become putrid in a few days.

The Indians scraped the roots to a pulp with oyster shells, and after pressing it, dried it before the fire, or cut it under water into thin slices which they dried.

I will now describe the Portuguese method of making farina from mandioca, as I witnesssed it in my Brazilian home. a *fazenda*, plantation, near Rio de Janeiro, Brazil. The mandioca, which loves a dry soil, was grown on the hillsides among the orange and the coffee trees. It was cultivated by the hoe. When its great masses of tubers were mature they were dug and hauled to the farina house, a cool room, tile-roofed, dirt-floored, and which contained mill, presses, and drying-pans. Then the merry work began. The negroes, who love to work in company, would sing, as, seated on benches or stools, they scraped the brown skin from the tubers. These were washed and fed to the mill, while the children took turns riding the mule which pulled the creaking beam that turned the mill.

The tubers are very juicy and, on being ground, make a milky white mass, which is put into soft baskets made of braided palm leaves. These baskets are placed under a heavy screw press, and the milky juice which flows from them is caught in tubs and set aside to settle. In twenty-four hours in the bottom of the tub is a deposit of starch several inches thick. This is the well-known tapioca of commerce, extensively used for puddings and other delicate foods; good also for starching clothes. The clear juice above it, a deadly poison, is drawn off through underground tiles—that no chicken or other living creature may taste it. The damp pulp in the baskets is transferred to large concave trays of brass or copper placed over a slow fire, where it is constantly stirred until entirely dry. It is now ready for use, is as coarse as corn meal, but very white, and has a pleasant flavor, resembling popcorn. It cannot be made into loaves, as much moisture would make it too glutinous to bake. It is eaten dry or mixed with beans or other vegetables at the table, or it is dampened and salted and baked on a griddle in a hoe-cake half an inch thick. In this way it is very nice and sweet. It is a favorite breakfast dish made into a clear glutinous mush called

pirao (pronounced *pe-rong*). Brazilians are very fond of the dry farina and throw it into the mouth by a movement so dexterous that it does not powder the face.

This is the bread of Brazil. Though wheat bread is sold in the bakeshops of the cities, it is not used to any great extent in the rural regions.

There is another species of mandioca called *aipin* (pronounced *i-peen*), which cannot be converted into *farinha*. It matures in eight months and has no poisonous qualities. It is a staple article for the table, being baked like a potato, and its taste resembles that of a roasted chestnut.

TRAVELING BIRDS.

Cleaving the clouds with their moon-edged pinions,
High over city and vineyard and mart;
April to pilot them; May speeding after;
And each bird's compass his small red heart. —*Edwin Arnold.*

RIVER valleys, coast lines, and mountain chains are the ways followed by the migrating birds; and frequent observations have determined the fact that birds travel at great heights, many as much as a mile from the earth. This may be one of the reasons why the tiny creatures have such keen sight; for from this distance they can obtain a far-reaching view of the surrounding country and distinguish landmarks readily.

If the weather is stormy or foggy, then the birds are obliged to fly much lower; and, too, it is then that the lights along the coast attract them and such countless numbers perish by being beaten against the lighthouses, many more birds being killed in the fall season of migration than in the spring, when the weather is less stormy.

They fly in vast numbers, and often on still nights they can be heard calling to each other. A good idea of their number can be obtained by the use of a telescope, which, if focused on the moon, will often show the birds on a brilliant background so that they can readily be discerned. The motion of their wings can easily be seen in this way, and the immense numbers of them better realized.

A good way to form an idea of the distance covered each year by the birds as they migrate is to take a single bird and note its journey. The bobolink makes his winter start in August, rests awhile in the marshlands and then visits the rice belt of the Southern states, doing damage directly and indirectly each year to an amount covering several millions of dollars. Then he flies over Cuba, and there his name is *chambergo*. Next he lingers along the coast of Yucatan, then goes on south through Central America and the island of Jamaica, in which place they call him "butter-bird," on account of his great plumpness, the result of the rice-feeding, no doubt; and from this place he makes one continuous long journey for over four hundred miles to Brazil, where he spends the winter. Here he stays until early spring, and then, if no accident has come to him, he will again brighten our months of blossoms by his chipper presence and his delightful song.

One of the most curious things observed in the fall migration of birds is in this same bobolink. By some manner of means many of these birds have gone west, some as far as Utah, to spend their summers, and when the winter is coming they, too, take their flight south, but not by the direct way through Mexico, and then to Central America, as would seem most natural, but following their hereditary instincts they come back to the Atlantic coast and journey down it, along the whole way to Florida, then across to Cuba, and on with those from New Jersey and New England until the winter resting-place is reached. This bird gives a most conclusive and interesting illustration of the permanency of bird routes and the "hereditary habit" of the winged flocks.—*Bangor Commercial.*

HORNBLENDE.—A mineral species, placed by Dana in the augite section of the anhydrous silicates. In common use the name is limited, as it was formerly applied only to the dark crystalline minerals which are met with in long, slender prisms, either scattered in quartz, granite, etc., or generally disseminated throughout their mass. The color of the mineral is usually black or dark green, owing to the presence of much iron. It appears to have been produced under conditions of fusion and cooling which cannot be imitated in the laboratory, the crystals obtained artificially being of augite type.

MALACHITE.—One of the native carbonates of copper. It is sometimes crystallized, but more often occurs in concretionary masses of various shades of green, which are generally banded or arranged in such a manner that the mineral, which takes a fine polish, is much prized as an ornamental stone. Great quantities of it are found in the Siberian mines, and many beautiful objects are manufactured from it.

QUARTZ.—The most abundant of all minerals, existing as a constituent of many rocks, composing of itself the rock known as quartzite or quartz rock and some of the sandstones and pure sand, forming the chief portion of most mineral veins. In composition it is silica, and when uncontaminated with any foreign intermixture it appears in clear, transparent crystals like glass or ice. Pure quartz is largely employed in the manufacture of glass and is commonly obtained for this purpose in the form of sand. Quartz veins with few exceptions form the gangues in which gold is found.

TOURMALINE.—A name applied to a group of double silicates, composed of many other minerals. The color of tourmalines varies with their composition. The red, called rubellite, are manganese tourmaline containing lithium and manganese, with little or no iron; the violet, blue and green contain iron, and the black are either iron or magnesium-iron tourmalines. Sometimes the crystals are red at one extremity and green at the other, or green internally and red externally, or *vice versa*. Pink crystals are found in the island of Elba. Tourmalines are not often used in jewelry, although they form beautiful gems and bear a high price. A magnificent group of pink tourmalines, nearly a foot square, was given by the king of Burmah to Col. Sykes, while commissioner to his court. The tourmaline appears to have been brought to Europe from Ceylon by the Dutch about the end of the seventeenth century, and was exhibited as a curiosity on account of its pyro-electric properties.

AGATE.—Of the quartz family, and is one of the modifications in which silica presents itself nearly in a state of purity. Agates are distinguished from the other varieties by the veins of different shades of color which traverse the stone in parallel concentric layers, often so thin as to number fifty or more to an inch. Externally the agates are rough and exhibit no appearance of their beautiful, veined structure, which is exposed on breaking them, and still more perfectly after polishing. Though the varieties of agate are mostly very common minerals in this country as well as in the old world, those localities only are of interest which have long been famous for their production and which still furnish all the agates required by commerce.

AMETHYST.—So named because it was supposed by the ancient Persians that cups made of it would prevent the liquor they contained from intoxicating. The stone consists of crystallized quartz of a purple or blue violet color, probably derived from a compound of iron and soda. The color is not always diffused through it, and is less brilliant by candlelight.

SERPENTINE.—Serpentine differs in composition from the other marbles. It is a soft mineral of different shades of green, of waxy luster, and susceptible of a high polish. It is better

LAWRENCE
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MINERALS.

HORNBLENDT.

CROCIDOLITE.

ROSE QUARTZ.
PINK TOURMALINE RUBELLITE
AGATE

AMETHYST.

SERPENTINE

CHICAGO :
A. W. MUMFORD, PUBLISHER.

adapted to ornamental work within doors than to be exposed to the action of the weather.

SULPHUR.—An elementary substance belonging to the class of metalloids. It has been known from the earliest times as the product of volcanoes, and as a natural mineral deposit in clay and marl formations. It also exists in primitive rocks, as granite and mica.

ACCIDENTS TO BIRDS.

GUY STEALEY.

STRANGE accidents happen to birds as well as to people, and some of them are as unexplainable as those that fall to our lot. I remember finding a meadow lark suspended from a barbed-wire fence several years ago, dead, its throat pierced by one of the sharp barbs. The bird had apparently attempted to fly between the wires and, miscalculating the distance, had dashed against the barb.

Another curious case which came under my notice was that of a small water bird. While walking along the bank of the river flowing through our place, I discovered the little fellow dangling from a willow, his head firmly wedged in one of the forks. He had been there some time, and how he ever got caught in that fashion is a mystery.

But the strangest mishap of all I ever witnessed occurred last summer. I was picking peas in the garden when my attention was attracted by the fluttering and half choked cries of a bird a little distance from me. Hastening to the place I found a brown field bird hanging from a pea vine. Around its neck was a pea clinger, which formed a perfect noose. As nearly everyone knows, pea clingers form into all imaginable shapes. The bird was feeding under the vines and, being frightened by my approach and in trying to escape, had thrust its head through the clinger with the above result. I soon freed it and saw it fly away but little the worse for the adventure.

To the Editor of BIRDS AND ALL NATURE:

I find your periodical most interesting and instructive, as it brings one into closer relation with all forms of life.

Better than a knowledge of Hebrew, Greek and Latin is it to know what the birds, the trees, and flowers all say, what the winds and waves, the clouds and constellations all tell us of coming events.

There is a world of observation, thought and enjoyment for those who study nature in all her varying moods that is denied those who, having eyes see not and having ears hear not.

In looking over BIRDS AND ALL NATURE I have noticed with pleasure some articles from the pen of Caroline Crowninshield Bascom that have particularly pleased me. Her interpretations of what her pet cats and birds have to say, their manifestations of intelligence, and the sentiments of affection, or envy, jealousy, and malice; their obedience and their moralities under her judicious training. A woman who can train a cat to live in harmony with a bird, to see each other caressed in turn by a beloved mistress, should be on the county school board as a successful educator. For boys and girls can be more easily trained than those in the lower forms of life. I trust Miss Bascom will not try to harmonize the cat with rats and mice, lest those natural-born thieves increase to such an extent that every municipality will be compelled to have traps and police in every nook and corner, in every cellar and garret of all our private and public buildings. There is a limit, dear Miss Bascom, to peace and good will on earth.

ELIZABETH CADY STANTON.

New York, July 1, 1899.

THE INFLUENCE OF PICTURES.

J. P. M'CASKEY.

IF IT is a very good thing to hang attractive pictures on the walls of the home, then it is doubly so thus to ornament the walls of the schoolroom. "In the emptiest room," says Ruskin, "the mind wanders most, for it gets restless like a bird for want of a perch, and casts about for any possible means of getting out and away. Bare walls are not a proper part of the means of education; blank plaster about and above them is not suggestive to pupils." The landscape makes a bright opening through the dead wall like a window; flowers and ferns are suggestive of the garden, the lane, the field, the woods, the purling stream; of songbirds in the air or among the branches, and blue sky overhead. Animals suggest a life with which we should be more or less familiar. The portrait speaks the man, what we know of him, suggesting trains of thought that may be most interesting and profitable.

A mother wondered why her three brave lads had all gone to sea from an inland home. She was speaking, in her loneliness, with a friend who had called upon her, and she could not suggest any reason why they should all have adopted the sea-faring life when none of their friends or relatives had been sailors. The man observed a picture of a full-rigged ship hanging above the mantel. It was perhaps the only picture in the room, at least the only one at all conspicuous. A thought struck him. "How long has that picture been hanging there?" he asked. "Oh, it has been there ever since the boys were little children." "It was that," he said, "that sent your boys away. The sea grew upon their imagination until they longed for it, and sought it, and so they are gone."

So a striking or attractive picture, in the schoolroom as in the home, may sink deep into the heart of the child, and mean far more to him than much of the work which the school program usually imposes. He may forget the name and lose all recollection of the personality of the teacher and of most of his schoolmates, but the striking picture is a picture still. That he will always remember. In our experience, as we grow older, if we are at all observant, we know more and more the value of these things—how great a factor in education they may become!

Men wonder sometimes how they can expend a modest sum of money to good purpose in giving pleasure and profit to others. Get some pictures of good faces, and flowers, and landscapes, and other proper subjects, and put them upon the walls of your nearest schoolhouse, or of some other in which you may be interested. When you have done this for one school you may want to do it for a second, or you will suggest to some other generous heart the like gift of enduring value. What chance have boys and girls with a dead-alive teacher in a school-house whose blank walls are eloquent of poverty? Oh, the weariness of it!

Real, genuine, helpful, beautiful art is now brought within reach of the million. The arts of chromo-lithography and half-tone engraving are putting exquisite pictures, at low cost, wherever there is taste to appreciate and enjoy them. In our homes they are everywhere. Why not everywhere also upon school-room walls bare of these choice educational influences? To many a child good pictures come like the ministrations of the angels. We feel this, we know it; and for the years remaining to us shall do what we can to make school-life better for the pictures on the wall.

THE SEA-CHILDREN.

COLE YOUNG RICE.

"Oh, mother, I lay
A-dreaming one day
By the wreck of the Alberdeen,
And I heard a singing
Under the sea
Of children swinging—
Their hair was green!—
In seaweed swings, and they called to me—
Oh, mother, they called to me"—

"Hush, hush thee, my child!
Thy prattle is wild,
For the children that dwell in the sea
Are the fishes swimming
Amid white shells
Whose pearly hymning
But echoed to thee
The strangled songs of the sinking swells—
My child, 'twas the song of the swells."

"And, mother, they said
"Come to us!—oh, dread
Not the waves tho' they fret and foam;
They're far, far over
Us while we play
Beneath the cover
Of our sea-home,
All day, all day o'er the beds of the bay!'
Oh, mother, the beds of the bay!"

"Hush, hush thee, my child!"—
But strangely he smiled
As he gazed at the weird-lit waves.
For he heard a singing—
"Come to us, come!"
He saw them swinging
In crystal caves,
And cried, "I'm coming! I'm"—ah, how numb
His death-dewy lips—how numb!

NATURE STUDY IN THE PUBLIC SCHOOLS.

AT THE Shaw banquet in St. Louis the subject for the evening was "Horticultural Education," and a good deal was said as to the introduction of the study in the public schools.

On the question of its interfering with other school work, Prof. Jackman of Chicago said: "The intimation has been thrown out here to-night that perhaps the child's study of nature might interfere with something else in the schools. I can assure such objectors that it will interfere with some of the things they are taught. It will interfere with some of the dull routine that you and I can recollect, which we passed through when we were in these schools. The children have waited all too long for such an interference."

State Superintendent of Schools Kirk, said: "It is my firm conviction that a large part of what we now call 'geography' should be eliminated from the school curriculum. Much of it is so worthless or misleading as to retard education and exhaust the children's energies without any definite purpose. Children should learn about the country they live in, rather than the remote regions of Asia and the Arctic Zone."

One speaker declared that the recreation time can be restfully utilized for nature-study work. Memory is good but observation is better, and teachers are asking for specimens of fruits, nuts, grains, grasses, woods, leaves, twigs, buds, and flowers.

BIRDS AND ORNITHOLOGISTS.

BIRDS has entered upon a new year with the satisfaction of having pleased its readers as well as having rendered actual service to the cause of education, ornithological literature and art. Nature with her usual prodigality has scattered thousands of rare and attractive birds throughout the world, and of these the editor of BIRDS selects the most interesting species, the loveliest forms and the richest plumage for preservation by means of magnificent illustrations, obtained through the expensive process of color photography. A unique treatment of text makes the magazine interesting and instructive to old and young alike. The people of this locality are noted for being lovers of birds and students of nature, and it has given the three greatest naturalists the world has ever known. This is the native heath of Audubon and Robert Dale Owen. Mr. S. G. Evans, the well-known dry goods merchant of this city, has a very fine and complete set of Audubon's birds. All this fills our eyes to think what the world lost in the death of William Hamilton Gibson. He made all life seem related to our lives, all being to appear one substance, all to be worthy of interest, sympathy, love, and reverence. There are strange and beautiful stories told of his power to attract and handle the shyest creatures. Once, it is said, he went to a public library in Brooklyn to make a sketch of some rare butterfly, and had found a book of plates from which he was studying his subject, when, lo! there floated into the great room one of the very specimens he desired to picture, fluttered down upon the open page, and at last rested with throbbing wings beside its own portrait. On one election day, Mr. Gibson went to vote, and as he was studying his ticket, there came in at the open door, no one knew whence, a stray pigeon, which flew at once to him and perched upon his shoulder. He caressed it in his tender fashion, and murmured to it, and then it flew away, no one knew whither. Once, too, as he sat upon his veranda at The Sumacs, his country home in Connecticut, describing to a visitor the peculiar markings upon the wings of a certain song-bird, he suddenly arose, stepped to a bush upon the lawn, and coaxed into his hand the very bird of which he was talking, and which he brought to show to his astonished guest. This sympathy with the world of life outside of man fills his text and his illustrations to overflowing.—*Evansville (Ind.) Courier.*

ACCORDANCE OF NATURE.

For Nature beats in perfect tune,
And rounds with rhyme her every rune,
Whether she work in land or sea,
Or hide underground her alchemy.
Thou canst not wave thy staff in air,
Or dip thy paddle in the lake,
But it carves the bow of beauty there,
And the ripples in rhymes the oar forsake.
The wood is wiser far than thou;
The wood and wave each other know.
Not unrelated, unaffied,
But to each thought and thing allied,
Is perfect Nature's every part,
Rooted in the mighty heart.

—*Emerson.*

O painter of the fruit and flowers,
We thank thee for thy wise design,
Whereby these human hands of ours
In Nature's garden work with thine.
And thanks that from our daily need
The joy of a simple faith is born.
That he who smites the summer weed
May trust thee for the autumn corn.
Give fools their gold and knaves their power,
Let fortune's bubbles rise and fall,
Who sows a field or trains a flower
Or plants a tree is more than all.
For he who blesses most is blest,
And God and man shall have his worth
Who toils to leave as a bequest
An added beauty to the earth.

—*Whittier.*

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WATER LILIES.

THE WATER LILY.

THIS is the name of an aquatic plant of the genus *Nymphæa*, distinguished for its usually very fragrant flowers and large, floating leaves; applied also to the yellow pond lily of the genus *Nuphar*. The species alba has a large flower filled with petals, so as almost to appear double; it raises itself out of the water and expands about seven o'clock in the morning, and closes again, reposing upon the surface, about four in the afternoon. The roots have an astringent, bitter taste. They are used in Ireland and in the island of Jura to dye a dark brown or chestnut color. Swine are said to eat it, goats not to be fond of it, kine and horses to refuse it. The flowers, the herb, and the root were formerly used in medicine, but are all now obsolete.

The lotus resembles our common white species in the form of the flower and leaves, but the latter are toothed about the edge. It is a native of the hot parts of the East Indies, Africa, and America, is very common in parks, lakes, and rivers in Jamaica and grows in vast quantities on the plains of lower Egypt, near Cairo, during the time they are under water. It flowers there about the middle of September and ripens toward the 12th of October. The Arabians call it *nuphar*. The ancient Egyptians made a bread of the seed of the lotus dried and ground.

All the species of water lilies grow well in large pots of water with a few inches of rich soil at the bottom. They are propagated by dividing the root, and some sorts which produce bulbs are increased by the offshoots from these. Mr. Kent, who cultivated these plants to great perfection, found that the bulbous-rooted nymphæa, if limited in their growth for want of water, or from cold or excessive heat, were apt to form bulbous roots and cease growing for the season. Hence the necessity of water and heat to make them flower freely.

The plant known especially in this country as the water lily, frequently as pond lily and sometimes as water nymph, was dedicated by the Greeks to the water nymphs. The fruit, which ripens under water, is berry-like, pulpy and thin, and each of its numerous seeds is enveloped in a thin sac. Of about twenty species two are found in the United States. Our common species has almost circular leaves, which often cover a broad surface of water on the margins of lakes and ponds, forming what are known as lily pads. The flowers are often over five inches across, of the purest white, and have a most agreeable sweet scent. In some localities the flowers are tinged with pink, and they are found, though rarely, with the petals bright pink throughout. The leaves also vary in size and sometimes are crimson on the under side. The root stalk, as large as one's arm and several feet long, is blackish outside and marked with scars left by the leaves and flower-stems; it is whitish within. Though the plant often grows in water several feet deep, the leaf and flower accommodate themselves to the depth, and they may sometimes be found where there are but a few inches of water.

At a place called Dutchman's Slough, we are informed by Mr. George Northrup, about half a mile above the outlet of Calumet Lake, south of Chicago, grow great quantities of water lilies, which are gathered every season for the Chicago market.

THE WHITE SWAN.

THIS magnificent bird is well known from being kept in a half-domesticated condition throughout many parts of Europe, whence it has been carried to other countries. In England, according to Newton, it was more abundant formerly than at present, the young being highly esteemed for the table. It was under special enactments for its preservation, being regarded as a "bird royal," which no subject could possess without license from the crown, the granting of which license was accompanied by the condition that every bird in the "game," the old legal term, of swans should bear a distinct mark of ownership on the bill. Originally this ownership was conferred on the larger freeholders only, but it was gradually extended, so that in the reign of Elizabeth upwards of nine hundred distinct swan marks, being those of private persons or corporations, were recognized by the royal swanherd, whose jurisdiction extended over the whole kingdom. At the present time the Queen's companies of Dyers and Vintners still maintain their swans on the Thames. The largest swanery in England is that belonging to Lord Ilchester.

It has been stated that the swan was introduced into England in the reign of Richard Cœur de Lion; but it is now so perfectly naturalized that birds having the full power of flight remain in the country. There is no evidence to show that its numbers are ever increased by immigration from abroad, though it is known to breed as a wild bird in the extreme south of Sweden, whence it may be traced in a south-easterly direction to the valley of the Danube.

The nest of the swan is a large mass of aquatic plants, is often two feet high and six feet in diameter. The eggs are from five to nine in number, of a grayish-olive color. The young are hatched in five to six weeks, and when hatched are clothed in sooty-gray down, which is succeeded by feathers of dark soot-gray. This suit is gradually replaced by white; but the cygnets are more than a year old before they lose all trace of color and become wholly white.

The swan of North America is considerably larger than that of the old world. The first species is the trumpeter, so-called, of which the bill is wholly black, and the second (*Cygnus columbianus*, or *americanus*) has the colored patches on the bill of less extent and deepening almost into scarlet.

Fossil remains of more than one species of swan have been found.

Our picture presents this stately bird swimming among water lilies, a sight that may be seen in summer in some of our American parks, notably the Central Park of New York City. Chicago and Cincinnati have some fine specimens. For portrait and sketch of the black swan, see Vol. III, pp. 66, 67.

NEBRASKA'S MANY BIRDS.

NEBRASKA is distinctively the bird center of the United States. It contains more species than any other state in the Union, and ornithologists who have studied its feathered possessions have classified 417 distinct species that may be seen within its boundaries. Of these 225 species breed here and the remainder are migrants who drop in on us at certain seasons and then pass on to their breeding-grounds. The natural features of Nebraska are largely responsible for this remarkable variety of feathered population. It includes a diversity of country that offers attractions for hundreds of songsters. For instance, the mocking-bird and the cardinal grosbeak, who are distinctive Southern birds, frequently appear in the southern corner of the state, and in the west we have a large number of what are usually regarded as mountain birds, but which come down from the foothills at intervals to the kingdom of Quivera.—*Omaha Bee.*

LURLALINE.

Old Irish Air.

There was a little water sprite, her name was Lurlaline;
Amid the water lilies white sometimes she might be seen.
She was a fairy child, Lurline, could sit secure and cool,
Upon those lily leaves so green you see in some lone pool.

There would she sit the summer day, singing a song so bright;
You never heard the song, you say, and don't believe it quite?
But that perhaps is just because when you quite near her stood,
You did not notice where she was, or listen as you should.

It happened in the month of June, the happy summer time.
She always sang a lovelier tune and wove a lovelier rhyme,
And you, too, like to Lurlaline, a lovelier song would sing,
If only you knew what they mean, the flowers and ev'ry thing.

If you were like a water sprite—the water sprites know well
The wondrous things of day and night, and all they have to tell;
They know and love the creatures wild, and all the flowers that grow;
They live with them and love them well, God's hidden pets they know.

And now if you want more to know what Amodine saw there,
You first must love all things below, in water, earth, and air;
You first must love all things that move among the trees and flowers,
And then you shall have more to love in shining fairy bowers.

A CONTRIBUTION TO CHILD-STUDY LITERATURE.

IT HAS been a blessed thing for the child and for humanity that the former has at last attracted our attention in a way to force upon us the conviction that it is time we found out what to do with him. People of scientific bent think this can be done by measurement and test experiments. Many fond and utterly unscientific mammas think it can be done by an all-absorbing deference to the child's whims; by setting the child on a pedestal and pouring ointments over him and bringing him sweetmeats and nectar on silver platters. I am not sure but it was this latter conduct on the part of the parent that called the attention of teachers to the need of a thorough study of the child and his requirements. For nothing else is so detrimental to the child's development as this growing tendency to pamper him.

The old method of treating the child was to ignore him; to let him be seen and not heard; to think that because he was young he could run errands all day, eat what was left at table, sleep in the coldest bed at night, and be thrust into the corner as an undesirable piece of furniture. Now the custom is exactly the reverse. In most well-to-do families the child is the central figure, and the parents stand around to minister to him. Nothing is too rich for him, and he becomes the darling, terror, and tyrant of the household.

As between the old boxing-glove method and this modern kid-glove method of handling the child the former is preferable—the hardier ones survive; but no character is proof against the seductive enervation of pampering.

These facts in regard to the development of youth have not escaped the notice of that keenest of observers, Rudyard Kipling. In "Captains Courageous" he has given us his opinion as to the best means of rescuing boys and girls who threaten to become utterly worthless, and of transforming them into useful men and women.—*Child-Study Monthly.*

THE YELLOW PERCH.

(*Perca fluviatilis.*)

THIS is a fresh-water fish and is generally distributed over Europe, northern Asia, and North America, and so well known as to have been, it is said, selected for the type of an entire family of spiny-rayed fishes, the *percidas*, which is represented in European fresh waters by several other fishes such as the pope and the pike-perch. It inhabits rivers as well as lakes, and thrives best in waters of a depth of not less than three feet; in large, deep lakes it frequently descends to depths of fifty fathoms and more. It occurs in Scandinavia as far north as the 69th parallel, but does not extend to Iceland or any of the islands north of Europe. In the Alps it ascends to an altitude of four thousand feet.

The shape of the body of the perch is well proportioned, but many variations occur, some specimens being very high-backed, others low and long-bodied. Sometimes such variations are local, and Agassiz and other naturalists at one time thought it possible to distinguish two species of the common perch of Europe; but it can be separated specifically from the North American form. The brilliant colors of the perch render it easily recognizable even at a distance. A rich greenish-brown, with golden reflections, covers the back and sides, which are crossed with five or seven bands. A large black spot covers the membrane between the last spines of the dorsal fin, and the lower parts are bright vermillion. In the large, peaty lakes of North Germany a beautiful variety is not uncommon, in which the golden tinge prevails, as in a gold-fish.

The perch is carnivorous and voracious. It wanders about in small shoals within a certain district, playing havoc among small fishes, and is therefore objectionable in waters where more valuable fry is cultivated. Perch of three pounds in weight are often caught; one of five would now be regarded as an extraordinary specimen, though in rare instances we read of individuals exceeding even that weight. An old fisherman, Mr. George Northrup, a man of rare intelligence, tells us that of thousands of perch caught by him he never took one that weighed above three pounds.

Perch are good, wholesome food and highly esteemed in inland countries where marine fish can be obtained only with difficulty. The nearly allied pike-perch is one of the best European food fishes. It is very prolific, begins to spawn when three years old, in April or May, depositing the ova on water plants.

MOUNTING OF BIRDS.

THE mounting of birds and the small animals of the field and forest is an art which is possessed by few people, yet which is not difficult and which especially appeals to the lover of nature. It is an art which it is well worth while popularizing, for it can be made the vehicle for the expression of a great deal of beauty, while preserving and making use, in the interests of scientific study, of materials which otherwise would be irretrievably lost. There has been need for some time of an authoritative work on the subject, something which would enable the amateur to mount birds and animals and which would be full and complete as to the information it conveyed. This want has been met by Mr. John Rowley, the chief of the Department of Taxidermy in the American Museum of Natural History, who has written a convenient volume of something over two hundred pages on "The Art of Taxidermy," which has just been published by the Appletons. In the foreword with which the author introduces the book he says that the name "taxidermy" was formerly applied to the trade of most inartistically upholstering a skin, but that of late years it has made wonderful strides.

BIRDS IN TOWN.

ELLA F. MOSBY.

WRENS are friendly to man. The little house wren in summer, and the Carolina wren in winter, give us a merry roundelay for all sorts of weather. Bewick's wren, Mr. Torrey says, "greatly prefers the town to woods and meadows," and even the winter wrenkin, dear little saucy brownie that he is, vouchsafes us a glimpse of himself now and then in the city. As for the bigger kinsfolk, the mocking-bird and catbird, they love the shrubbery of our lawns, and gardens, and sing close at hand. Nor are the thrushes, shy as they are in the breeding season, hard to discover during the migrations. A Swainson's thrush will sit for an hour or so, almost within touch, his big liquid eyes regarding his human neighbors placidly.

Strange to say, I have seen but few swallows or sparrows in town, except the chipping or "door-step" sparrow and the purple martin which belongs to the swallow tribe, though the misnamed chimney swallow does *not*. The song of the martin, "like musical laughter rippling through the throat," and the "giggling twitter" of the chimney dweller, often seem to drop to us out of the air as they dart overhead. Even pewees and cuckoos visit us after their broods are reared, the wistful cry of the first and the rattling call of the latter, sounding oddly from some tall tree close by the crowded street. At this time too, the grackles perch upon the roofs, and nighthawks and whippoorwills are heard overhead in the dusky twilights.

One would not naturally expect to find game birds or birds of prey in a city, yet the Virginia quail frequently sends forth his ringing "bob white!" from any low roof or fence in the spring or early fall; and more than once long-billed water-birds have been caught by the street lamps at night. The eerie, tremulous cry of the little screech-owl sounds from the apple tree, and in winter he flies with a soft thud against the window pane, attracted by the light shining through the snow. Some owls choose a belfry tower as their favorite shelter, and live there year after year.

Our most glorious bird-day is when the orioles appear in flashing black and gold with ringing whistle, or their orchard cousins in ruddy chestnut tints, alternately singing and scolding, *chack! chack!* and little later, come the scarlet and summer tanagers to the parks and public gardens, lighting up the tall trees with their splendid color, and making the neighborhood ring with their *chip-chur* and *chicky-tuck!* as if in call and answer. One day I saw these, and not far away, the crested cardinal, glowing like a tropical flower, and the red-headed woodpeckers close by, and some redstarts glittering and flitting from bough to bough, truly a study in red!

As for the smaller birds, humming birds, kinglets, vireos, and warblers, the trees of any city yard will be a frequented hostelry for all during their wonderful journeys, and for many as a summer home. Those that love the tree tops are seen all the better by human inhabitants of upper stories, and some of our most charming bird-books give us the experiences of a busy woman in a New York flat, or of another in a Chicago back yard, and of more than one invalid, watching these free, joyous lives with unenvious delight. A good glass, either opera-glass or field-glass, will open many a pretty bit of house-weaving, and brood-rearing to an observer shut in by walls and pavements, and bring many a pleasant acquaintance. At this very moment, a slender grey catbird glides through the boughs close by my upper window, with a low *chuck, chuck!* as I glance at him. He knows I am a friend, but would fain enjoin silence, for a black cat prowls below.

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THE OVENBIRD—GOLDEN-CROWNED THRUSH.

NELLY HART WOODWORTH.

A MARVELOUS choral is the rare ecstasy song of the ovenbird (see Vol. III, 126–7). It was first recorded, at a comparatively recent date, by that versatile writer—poet, essayist, naturalist—Mr. John Burroughs. After speaking of the bird's easy, gliding walk, it being one of the few birds that are *walkers*, not *hoppers*, he says its other lark trait, namely, singing in the air, seems not to have been observed by any naturalist. Yet it is a well-established characteristic, and may be verified by any person who will spend a half-hour in the woods where this bird abounds on some June afternoon or evening. I hear it frequently after sundown when the ecstatic singer can hardly be distinguished against the sky. Mounting by easy flights to the top of the tallest tree, he launches into the air, with a sort of suspended, hovering flight, and bursts into a perfect ecstasy of song—clear, ringing, copious, rivaling the goldfinch's in vivacity and the linnet's in melody. Its descent after the song is finished is rapid, and precisely like that of the titlark when it sweeps down from its course to alight on the ground.

The same writer speaks of waking up in the night, just in time to hear a golden-crowned thrush, the ovenbird, sing in a tree near by. It sang as loud and cheerily as at midday. My first acquaintance with this rare overture was at the close of a hot day in July, as I was walking with a naturalist. A splendor floated in the air like a musical cloud as strange notes of gladness rang through the twilight with the clearness of a silver bugle. It came again, a clear, sweet, outpouring song, which I recklessly attributed to several goldfinches singing, as they often do, in concert. The trained ear of the naturalist was not so easily deceived, and when my attention was called to the more gushing character of the melody I wondered that it could have escaped notice. It was a very irrigation of song, the bursting of some cloud overhead that scattered melodious fragments all about, a mating-choral unheard, probably, after the nesting season is over.

Entering the woods in early summer this bird is sure to shake out its ordinary, rattling chorus — "Teacher, *Teacher*, TEACHER," the notes delivered with tremendous force and distinctness and the emphasis increasing—a vibrant, crescendo chant as unlike the brilliant ecstasy song as can be imagined.

The ovenbird is also called the golden-crowned thrush, for no conceivable reason unless it is that the bird is *not* a thrush, but classed with the warblers. Or is it that its white breast, thickly spotted with dusky, resembles the thrush's? There is a peculiar delicacy in the texture of its olive-green robes, as fine as if woven in kings' houses, while, set deep in hues of the raven's wing, it wears that regal appurtenance—a crown of gold.

While watching from a rocky height a pair of hermit thrushes that were housekeeping in a hemlock beneath, an ovenbird flew from a maple bough to a high clump of ferns near by. In its beak was a quantity of dry grass, bulky material that interfered sadly with both walking and flight. The small burden-bearer managed, however, to progress slowly, moving its head from side to side to disentangle the grasses and lifting its little feet in the daintiest manner, until it disappeared where the ferns were thickest. Pretty soon it came in sight again, sauntered about with diverting nonchalance, and was off, alighting upon the same bough to drop down into the same corner of the thicket. This behavior was not without an inference; it was an advertisement of future hopes too plainly written to escape notice; I might have been stone blind and seen straight into the future! The

nest must have been within a circle of a few feet, but with rank greenery above and underfoot the accumulated leafage of the ages, soft and penetrative as if placed layer by layer for the bird's special accommodation, any square foot might have held the treasure and kept the secret of possession.

Soon after a farmer told me of a strange nest, a curiously covered house with a low door, within which the sitting bird could be seen. The bird's flight as it left the nest first attracted his attention, just in time to prevent his foot from crushing through the roof. He had never heard of ovenbirds or of roofed-over nests, and was so interested in this new page of natural history that "once a day when he went for the cows he went round that way to see how things were getting on there."

"Every time I went," he said, "I expected to find that the cattle had spoiled it!"

After describing his interesting tenants he offered to share the pleasure of their acquaintance, saying most kindly, "I wouldn't mind leaving the hayfield any time to take you there! I've done my share of haying, I guess; the boys don't want me to work so hard; come up to-morrow and I'll go with you!"

I was there with to-morrow and was, if possible, more amazed at the adaptation of the "oven" to its surroundings than with the structure itself.

The bird was sitting and not at all disposed to leave on our account; she merely drew in her pretty head, cuddled closer to the ground, and waited. Both house and tenant were so thoroughly blended in color with the enviroring leafage that, when pointed out, it was difficult for the eye to locate them. Possibly the brave little housekeeper divined the situation; or did she presume upon a previous acquaintance with the friendly farmer? The proprietor of the establishment, a little man-milliner with a bow of orange ribbon in his bonnet, sang through the fragrant morning as if glad of an opportunity of speaking to a gracious audience, interlarding his song with rushing over to his family—*vault*, I was going to say, for being sunken a bit in the ground and dark within, it suggested a mausoleum. A tiny ledge of slate, tilted vertically, made a strong wall upon one side of the small estate; young beeches, kept down by browsing cattle, grew where the rear-gates should have been, and a maple twig partially screened the entrance. Evergreen ferns crowded between the "oven" and the wall, their leaves interlaced, above the roof, with others opposite, the tips of two being caught down and interwoven with the roofing. The nest was made of dry leaves, lapped and overlapped, padded and felted in one compact arch—a veritable arch of triumph! Upon July 15th six creamy-white eggs, dotted with brown and lilac, lay safe within, these being duly replaced by a round half-dozen "little ovens," whose mouths were always open. Indeed, more food was shoved into those open-mouthed storehouses than would have supplied a village bakeshop, and still there was room for more. Warm rains soon gave the nest an unyielding texture; so matted and felted that the full weight of the hand left no impression, and I questioned whether the foot, set plumply down, would have crushed it out of shape entirely.

When the young birds had flown I brought home the nest as a unique souvenir of summer. Removed from the picturesque setting it was no longer interesting; its charm was that of environment; its beauty the marvel of adaptation.

So surely does Nature equip each bird with an individuality that distinguishes it from all others! Not only have they common rules followed in obedience to the law of instinct, but each species has special gifts developed according to the law of its nature, a law of harmony so delicately enforced that the law itself is not perceptible.

INSECT LIFE UNDERGROUND.

L. O. HOWARD, PH. D.,
Entomologist U. S. Department of Agriculture, and Curator Department of Insects, U. S. National Museum.

THERE is an old German child's story of a little girl who being told that if she could find a place to hide her first silver piece where no eye could see her, and then dance round it three times, she would have her wish. She sought everywhere for such a place, but always some bird or squirrel or mouse or insect was near by, and even when she dug beneath the ground, there too were little crawling creatures watching her.

It may be said that this story was meant to show that animal life is found almost everywhere, and certainly beneath the surface of the ground there are hundreds of kinds of insects working steadily away at their different occupations; for whatever disagreeable things you may find to say about insects, you can never justly call them lazy. The scriptures recognized this fact in the well-known command to the sluggard, and the old nursery rhyme about the "busy bee" emphasizes the same characteristic.

The truest underground insects are those which pass their entire lives beneath the surface of the earth; which are born there, live and grow and die without seeing the light of day. Such, for example, are the true cave insects, a number of forms of which are found in the great caverns in different parts of the world. Some of these insects feed upon the vegetable molds and low forms of plant life found in caves; others feed on dead animal matter and still others upon living insects. Nearly all are of pale colors and are blind or nearly so, for they have no use for eyes in the darkness. All are supposed to be descendants of above-ground forms, which through many generations of life in the darkness have lost their color and their power of sight. The genealogy of these true cave forms may be guessed at with some certainty, for we know insects which are only partly transformed in structure from above-ground forms to true cave species. Such are certain beetles which live in the catacombs of Paris, and certain other insects which have been found in the old and deep burrows of the land tortoise in Florida.

But we do not have to go to caves to find many other true underground insects. Rich, loose soil abounds in such creatures which live upon the decaying vegetation (soil humus or vegetable mold) or upon one another. The most abundant in numbers of individuals are the little spring-tails or bristle-tails, minute creatures seldom more than a sixteenth of an inch in length and which frequently swarm in the ground in such numbers that the earth seems fairly alive. These little creatures are by no means confined to the surface soil, but have been found in great armies at a depth of six feet or more in stiff clay, which they have penetrated by following the deeper rootlets of trees. Certain of these little insects have also become so accustomed to this lightless life that they have lost their eyes.

Other true underground insects are found in the nests of ants, where they fill many different functions. They may be grouped, however as follows: 1. Species which are fed by the ants and from which the ants derive a benefit by eating a certain secretion of the insect. 2. Species which are treated with indifference by the ants and which feed upon the bodies of dead ants and other animal and vegetable debris to be found in ants' nests. The ants are certainly not hostile to these insects and evidently gain some unknown benefit from their presence. 3. Species which live among the ants for the purpose of killing and feeding upon them. The first true ants' nest insect was only discovered and studied at the beginning of this century, but since that time hundreds of other species have been found, and a mere catalogue of their names fills a book of over 200 pages.

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(CHLAENIUS SERICEUS.) (LIBIA GRANDIS.) (CICINDELLA REPANDA.) (CICINDELLA GUTTETA.) (CICINDELLA LECONTEI.) (BRENTHUS MANTIS.)

(ALAUS (PASMACHUS (NECROPHORUS (DICAELUS

Such insects are called "myrmecophilous species" or "ant lovers." The man who has done the most in the study of these interesting creatures is Dr. Wasmann, a Jesuit priest, who lives in Holland, and who has devoted many years to this work, and a difficult task it has been! If one digs into an ant-hill the inhabitants are at once alarmed and the greatest confusion results, so that it is necessary to study them in artificial nests in glass jars, or in some other way.

Although the most of these "ant-loving" insects are strictly subterranean species, living their whole lives underground, the ants, among which they live, do most of their foraging above ground, and thus may be taken as typical of a second group of underground insects—those which have their homes below ground for protection or concealment, but which themselves live, at least part of the time, above ground. Volumes have been written about the wonderful habits of ants, of their community life, of the division of labor among them, of their slave-making customs, of their courage, patriotism, and indefatigable industry, of their highly developed instinct, which, in fact, becomes real intelligence; so that almost everyone knows the main facts about these wonderful little insects, and we can spend our time to better advantage on those underground creatures about which there is less general information. It will suffice to say that most ants have their nests, consisting of tunnels and chambers, underground; that there their queen lays her eggs and the young are carefully tended by workers until they have reached the adult stage, and there the food is stored for use in the winter months. There is a curious kind of ant in the southwestern states and Mexico called the honey ant. Certain individuals in a colony of these honey ants have enormously distended stomachs and are fed by the other ants with a kind of grape sugar, or honey, during the summer, as they hang suspended by their legs from the roof of an underground chamber. When winter comes the other ants are fed by these honey-bearers, which give out the stored-up honey from their mouths drop by drop.

There is an interesting class of underground insects which, in their early stages, hide in especially dug pits and lie in wait for their prey, but which, when full grown, live above ground. Such are the ant-lions and the tiger-beetles. The young ant-lion is a heavy-bodied, clumsy-looking creature, with very long and sharp jaws, which digs for itself a funnel-shaped pit in loose, dry sand, using its flat head and jaws as a spade in digging. Then it hides itself at the bottom of the pit, its body completely covered with the sand, and waits until some unlucky little insect comes along and stumbles over the edge of the hollow. The side of the hole is made at such an angle that the sand slips down with the weight of even an ant and carries it towards the open jaws of the ant-lion. Every struggle which the poor creature makes to escape causes the sand to slide down faster, and the ant-lion at the bottom jerks up a shower of sand with its head, which hastens the miniature avalanche until the poor victim is within reach of the powerful jaws and is devoured. The adult ant-lion is a beautiful, gauzy-winged creature, not at all like its blood-thirsty larva.

The young tiger-beetle, or "doodle bug," as it is called in the South, digs a straight burrow in hard soil, such a hole as would be made by pushing a small lead pencil into the ground. This creature, like the young ant-lion, has a clumsy body and powerful jaws, and on its back are two projections armed with hooks which help it to climb up and down in its burrow. It waits for its prey at the mouth of its hole, which it closes with its head, thus making a sort of trap-door. The little insect which steps upon this trap-door doesn't have time to say its prayers before it is devoured by the voracious "doodle." Should a large, strong insect walk over the burrow, the tiger-beetle larva retreats precipitately to the bottom of its hole, which is sometimes eighteen inches below the surface of the ground.

There are many other insects which,

when young, live below ground, and become above-ground flying creatures, when full grown, which have not the carnivorous tastes of the forms we have just mentioned. Many of these species live on the roots of plants and others upon the vegetable mold of rich soils. The large white grubs so often found in the soil of grass lands belong to both of these classes. They are the larvæ, or young, of several kinds of the clumsy beetles known as scarabs. The larvæ of the common brown May-beetles, for example, are root-feeders, living mainly on grass-roots, and they are sometimes so abundant and destructive as to destroy valuable lawns. The roots are sometimes so uniformly eaten off by these white grubs that the sod may be rolled up like a roll of carpet. The white grubs of the beautiful large green beetles, known as June-beetles, or fig-eaters, in the South (they do not occur in the more northern states), although they look almost precisely like the May-beetle larvæ, are not injurious and feed only upon the vegetable mold of the soil. The wire-worms, which are the young of the click-beetles, or "snapping-bugs," feed upon the roots of plants; there are plant lice which live underground and suck the sap from plant roots, like the famous grape-vine phylloxera; there are caterpillars which live almost entirely underground and feed upon living roots; there are maggots which have the same habit; and there are even bark lice or scale insects which live attached to rootlets in the same way that the other species live above ground on the limbs and twigs of trees.

Other insects living above ground all their lives hide their eggs underground. Most grasshoppers, for example, do this, and many of the closely related crickets not only hide their eggs in this way, but live underground themselves in the day time, and come forth at night to feed, or to collect grass leaves, which they carry into their burrows and eat at leisure. Other insects also hide below ground during the day and feed only at night. The full grown May-beetles do this, and the cut-worms also. The cut-worms are soft-bodied caterpillars and are greedily eaten by birds and carnivorous insects, so it is essential to their safety that they conceal themselves as much as possible. There is an interesting cut-worm which occasionally becomes so numerous that it has to migrate in great armies in search of food, and these great masses of caterpillars hurry on, driven by hunger, by day as well as by night, followed by flocks of birds and other enemies until the majority of them are destroyed. This cut-worm is generally called the "army worm."

Other caterpillars, while living above ground and feeding on the leaves of plants, instead of spinning cocoons for their protection when they transform to the helpless chrysalis or pupal condition, burrow beneath the surface of the ground and there transform without a cocoon. Hundreds of species do this and sometimes these brown pupæ are so abundant that they are turned up in numbers with every spadeful of earth.

We are now able to say that the insects found beneath the surface of the earth are as follows:

1. Insects which live underground during their whole lives, feeding (*a*) on roots and rootlets; (*b*) on dead and decaying vegetable matter; (*c*) on other insects.

2. Insects which live in the nests of ants.

3. Insects which have their nests underground, but which get their food elsewhere.

4. Insects which live underground only in their younger stages of life.

5. Insects which hide their eggs or pupæ underground.

6. Carnivorous insects, and insects which feed on decaying animal matter, which occasionally burrow underground in search of food.

I hope it will be clear from what we have said that insects must take an important part in the changes in the character of the soil which are constantly going on, quite as important indeed as do the earthworms about which Darwin wrote.

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

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FORESTS.

JOHN M. COULTER, PH.D.

Head Professor of Botany, University of Chicago.

FORESTS have always been admired, and in ancient times they were often considered sacred, the special dwelling-places of gods and various strange beings. We can easily understand how forests thus affected men. There is a solemnity about them, a quiet grandeur, which is very impressive, and the rustling of their branches and leaves has that mysterious sound which caused the ancients to people them with spirits. We still recognize the feeling of awe that comes in the presence of forests, although we have long since ceased to explain it by peopling them with spirits.

Once forests covered all parts of the earth where plants could grow well, and no country had greater forests than North America. When America was discovered, there was a huge, unbroken forest from the Atlantic west to the prairies. Now much of this has been cut away, and we see only small patches of it. Men must use the forest, and still they must save it, and they are now trying to find out how they may do both.

Forests are sometimes almost entirely made up of one kind of tree, and then they are called "pure forests." Pine and beech forests are examples of this kind. More common with us, however, are the "mixed forests," made up of many kinds of trees, and nowhere in the world are there such mixed forests as in our Middle States, where beech, oak, hickory, maple, elm, poplar, gum, walnut, sycamore, and many others all grow together.

Probably the densest forests in the world are those in the Amazon region of South America. So dense are they that hardly a ray of light ever sifts through the dense foliage, and even at noon there is only a dim twilight beneath the trees. The tallest forests are the Eucalyptus forests of Australia, where the trees rise with slender trunks to the height of four or five hundred feet. But the largest trees in the world, when we consider both height and diameter, are the giant "redwoods" (Sequoias) of the Pacific coast. All concede, however, that the most extensive, the most varied, and the most beautiful forests of the world are those of the Atlantic and Middle States.

Perhaps it is well to understand how a tree lives, that we may know better what a forest means. The great roots spread through the soil, sometimes not far from the surface, at other times penetrating deeply. The young root tips are very sensitive to the presence of moisture, and turn towards it, no matter in what direction it may carry them. In penetrating the soil the sensitive root tips are turned in every direction by various influences of this kind, and as a result, when the root system becomes old, it looks like an inextricable tangle. All this tangle, however, but represents the many paths that the root tips followed in their search for the things which the soil contains.

Roots are doing two things for the tree:

They anchor it firmly in the soil, and also absorb material that is to help in the manufacture of food. It is the older roots that have long since stopped absorbing that are the chief anchors. How firm this anchorage must be we can, perhaps, imagine when we think of the strain produced by a great crown of leaves swaying back and forth in the wind. It is only a cyclone that seems to be able to overthrow a sound tree, and then it more commonly breaks its trunk than uproots it.

The very important work of absorbing is given over to the very young roots; in fact, chiefly to those of this year, for new rootlets must be put out each year. These roots can only absorb water, so that if they are to get anything from the soil it must be something that water will dissolve. In this way the water is used as the carrier of soil-material into the root. Just how this water carrying soil-material gets into the root is not easy to explain, for the root has no holes to let it in, and it must pass through living walls. That it does enter, however, every one knows. It is evident, therefore, that the root is supplying to the tree two kinds of raw material for food manufacture obtained from the soil, namely, water and soil-material dissolved in it.

But the tree does not obtain all its raw material from the soil. A very important material is taken from the air, the material commonly called "carbonic acid gas," the same material that we breathe out so abundantly from our lungs as one of our body wastes. This important material is taken out of the air into the plant chiefly by means of the leaves. Spread out as they are in the air, the leaves are in the most favorable position for doing this work.

But where and how are these three kinds of raw material manufactured into plant food? The leaves are specially constructed to be the chief seat of this food manufacture. The carbon gas is received directly into these manufactories from the air, but the water and the soil-material are down in the roots, and it is necessary for them to be carried to the leaves. As a consequence, a "current" of water containing soil-material ascends from the roots, through the stem, and is distributed through the branches to the leaves. This movement is generally known as the "ascent of sap." The path of this movement in the stem is through what is known as the "sap wood," and it is this very fact which gives to this region of the wood its peculiar character. Just how the sap ascends through the stem and reaches the leaves, no one knows. All of our explanations have proved unsatisfactory, and only those who are not fully acquainted with the facts claim to be able to explain it.

When the sap reaches the leaves, the water is no longer needed as a carrier of soil-material. Some of it is needed in the manufacture of food, but by far the greater part of it escapes from the leaves into the air by a process which may be called "plant evaporation." The amount of water thus brought from the soil and poured out into the air by active plants is very great; and when we consider a forest at work, we can hardly compute the vast amount of moisture which it is constantly contributing to the air during the growing season.

The three kinds of raw material thus brought together chiefly in the leaves are there manufactured into plant food. On account of this work the leaves have often been spoken of as the "stomachs" of the plant. This is a very incorrect and misleading illustration, for the work referred to is not digestion such as a stomach is concerned with, and, in fact, it is a process entirely unknown in animals, and found only in green plants. It is a wonderful process, which we do not at all understand, but it consists in taking this dead raw material from soil and air and manufacturing out of it living material. Not only does the food of the plant, and hence its life, depend upon this process, but all the life of the world, as we understand it, depends upon it. We know at least two prominent conditions of this pro-

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cess, for it seems evident that it cannot take place without light and the peculiar green substance which gives the characteristic color to leaves. With the help of light and this green coloring substance, known as "chlorophyll," the living substance in the leaves is able to do this marvelous work.

The food thus manufactured is distributed throughout the tree, either to be used wherever growth is going on, or to be stored up. While we may say that there is an "ascending current" of sap through the sap wood, it is an error to say that there is a "descending current." The movement of prepared food has no definite channel, but it is drawn in every direction wherever needed.

If we now consider the parts of a tree all together, we may be able to get some notion of the meaning of their positions. The roots must be related to the soil to secure anchorage and raw material for food manufacture. The leaves must be related to the air and light to secure more raw material and help in doing their important work of food manufacture. The stem is simply to carry the leaves well up into the air and sunshine, and has no meaning except as it is related to the work of the leaves. In thus widely separating the roots and the leaves, the stem must act as a channel of communication between them.

In the tree trunks with which we are familiar, everyone has observed the concentric rings of wood that appear in a cross-section. These are usually spoken of as "annual rings," with the idea that one ring is made each year. In consequence of this it is the habit to estimate the age of a tree by counting these rings. Not infrequently it happens, however, that more than one ring may be made in a year, as a ring represents a single season of growth, and there may be more than one season of growth during a single year. It is much better to call them "growth rings," and to recognize the fact that by counting them we may be overestimating the age of a tree.

One of the most noticeable things about the principal trees of our temperate climate is that they "shed" their leaves every year, being covered with foliage during the growing season and bare during the winter. This is known as the "deciduous" habit, and such trees are called deciduous trees, in distinction from "evergreen" trees. This is really a habit, brought about by the conditions in which trees of temperate climates must live. The leaves of such trees are broad and thin, fitted for very active work. When the winter comes, they would be entirely unable to endure it. The tree might protect them by giving them narrow forms and thick walls (as in pines), but it would be at the expense of activity during the growing season. It is more economical for the tree to make an entirely new set of leaves each year than to protect the old ones.

Perhaps the most noticeable feature in connection with the fall of the leaves is that so many of them take on a rich coloration. Our mixed American forest is the most brilliantly colored autumnal forest in the world, and there can be no landscapes richer in color than those which include such a forest. While all this should appeal to our sense of the beautiful, it should raise the question as to what it means in the life of the trees. We are not at all sure that we know, for we cannot as yet explain the conditions which cause the colors to be produced. We observe that they occur towards the end of the activity of the leaf, but that they are necessarily associated with cold, or drought, or certain outside conditions, is not at all clear. The colors are various shades of red and yellow, sometimes pure, sometimes mixed. It has been recently suggested that the red color is to serve as a protection. It is known that before the fall of the leaf the living substances are gradually withdrawn into the permanent parts of the tree, and that when these living parts cease to work they are peculiarly helpless. At this unprotected period the red appears, and this color absorbs enough heat from the light to raise the temperature, and so the needed pro-

tection against chill is afforded. This seems reasonable, but the whole subject of the meaning of plant colors is very obscure.

GEN. ROBERT E. LEE was a great lover of forest trees. He owned a large and beautiful forest in northern Virginia at the time of the War of the Rebellion. While the army of Virginia was encamped near Fredericksburg, he was gazing at the great forest trees that beautified a homestead near by, the property of his companion. This companion quotes him as saying on this occasion: "There is nothing in vegetable nature so grand as a tree. Grappling with its roots the granite foundations of the everlasting hills, it reaches its sturdy and gnarled trunk on high, spreads its branches to the heavens, casts its shadow on the sward; and the birds build their nests and sing amid its umbrageous branches."

THE BRAVE OLD OAK.

A song to the oak, the brave old oak,
Who hath ruled in the greenwood long;
Here's health and renown to his broad green crown,
And his fifty arms so strong.
There's fear in his frown when the sun goes down,
And the fire in the west fades out;
And he showeth his might, on a wild midnight,
When the storms through his branches shout.

Then here's to the oak, the brave old oak,
Who stands in his pride alone;
And still flourish he, a hale, green tree,
When a hundred years are gone.

In the days of old, when the spring with cold
Had brightened his branches gray,
Through the grass at his feet crept maidens sweet
To gather the dew of May;
And on that day, to the rebeck gay
They frolicked with lovesome swains;
They are gone, they are dead, in the churchyard laid,
But the tree, it still remains

Then here's to the oak, the brave old oak,
Who stands in his pride alone;
And still flourish he, a hale old tree,
When a hundred years are gone.

He saw the rare times when the Christmas chimes
Were a merry sound to hear,
When the squire's wide hall and the cottage small
Were filled with good English cheer.
Now gold hath the sway we all obey,
And a ruthless king is he;
But he never shall send our ancient friend
To be tossed on the stormy sea.

Then here's to the oak, the brave old oak,
Who stands in his pride alone;
And still flourish he, a hale, green tree,
When a hundred years are gone.

—*Henry Fothergill Chorley.*

"CHEEPER," A SPARROW BABY.

BY ANNE W. JACKSON.

ONE day in May, as I was hurrying along the street, my steps were arrested by the distressed chirping of a sparrow on the opposite sidewalk. Thinking that probably a young sparrow had fallen from the nest, I picked my way across the muddy road to the other side to see what I could do.

The poor little sparrow-mother was wildly hopping about and chirping in sore distress. And what a pitiful sight greeted my eyes! Upon the wet grass, under the very jaws of an evil-looking little black-and-tan dog, was a poor, draggled, shivering baby sparrow.

At sight of me the dog coolly picked up the baby and trotted off. I followed and he soon dropped it; but I couldn't succeed in driving him away. He still remained in sight, bold and impudent.

I was in a sad dilemma. Of the two evils which confronted me, or rather the baby, which would prove the less?

The trees all about the place were tall ones, with no low branches. There was no hope of returning the baby to its nest. It was too weak from cold and fright, as well as too young, to fly. If I left it the dog would certainly return and devour it before its mother's eyes.

On the other hand, if I took it home with me it would probably die under my ignorant care. However, I decided on the latter course, so clasping it close in my hand, continued on my way.

Those who have a continual grudge against the English sparrow will say, "Why all this fuss over a miserable little nuisance of a sparrow?" and think the wisest thing would have been to leave it to its fate. But the superfluity of the English sparrow is not the question in a case like this. When something weak and helpless is thrown across our path, it simply remains for us to help and save it, if it is in our power.

On the way home I pondered a good deal over the question of how I should care for it and feed it, and what I could find to keep it in, as I had no bird-cage.

When I got Master Sparrow home, and had thoroughly warmed him and dried his little feathers (they were very few!) I put him into the best substitute for a bird-cage that I could find, and that was a large wire rat-trap!

The next question was, what to feed him. As I had seen sparrows picking at the cornmeal which we mixed and gave to the little chickens, I ventured to put some of it into his cage.

I watched him a good deal that day and didn't *see* him eat a morsel. But as he seemed stronger and more lively the next day, I concluded he was bashful and only ate when I wasn't looking.

Soon, however, he grew less afraid of me and would hop about and peck at his food when I was near. I began to vary his diet, too, and gave him what green slugs I could find on the rose-bushes, as well as minced earthworms. He ate the slugs eagerly and seemed to enjoy tugging at wriggling bits of earthworm.

He also began to develop quite a voice and "cheeped" so loudly that I named him "Cheeper."

I grew very fond of him and watched him grow and feather out with great pride and interest. As he became stronger he grew more eager to get out of his cage. It quite went to my heart to see him beating against the wires, and vainly striving for freedom. But I feared he couldn't take care of himself; and also that the other birds might not receive him well.

So I kept him seven days. I put his cage in the window several times where he could look out on the world and become acquainted with the colony of sparrows which inhabits the Virginia creeper covering the north side of our house. He would "cheep" very loudly on these occasions and try harder than ever to get out. His presence in the window made a great commotion among the other sparrows, who chirped excitedly and flew about, taking long looks at him. Two of them went so far as to alight on his cage.

On the seventh day, at noon, I took his cage to the window and set him free. He flew the length of the house and settled on a rosebush at the end of the porch, where he sat for some time, peering about, with his little head comically hoisting this side and that. Presently, when I came to the window to see if he were still there, I found he had flown away; and though I thought I could distinguish his particular "cheep" several times afterwards, I saw him no more that day. Nor did I expect to see him again.

I missed him a great deal and was surprised to find how fond of him I had grown. Imagine my surprise and delight when I went out next morning to feed the chickens to find little "Cheeper" there before me! He flew onto the fence when he saw me, but soon flew down again, and hopped about among the little chicks quite fearlessly. I was afraid the big chickens would step on him; and, sure enough, the Bantam rooster *did* walk right over him, but he just squawked and hopped away without any apparent resentment.

The next morning he was there again, when I went out. This time he followed a hen about, hopping along with her little chicks as though he thought himself one of them. He was such a fluffy little fellow, and he did look so tiny and cunning!

Poor little motherless baby, trying to find a mother in a big hen! That was the last time I saw him.

Only a despised little English sparrow! Yet, little "Cheeper," you had your mission in life. You made the heart of one bird-lover more tender by your helplessness, and your memory is dear to her.

THE HERMIT THRUSH.

NELLY HART WOODWORTH.

Does the thrush drink wild honey? a nectar distilled
From the flowers of the field, that his message is filled
With such sweetness? O'er the twilight 'tis ringing—
June's divinest refrain, 'tis a soul that is singing,
Oh, so trustfully sweet, rapture blended with pain,
Rings the silver bell softly, I hear it again,
And the wood is enchanted, uncertain it seems,
As some moment of waking, the dreams, oh the dreams!

Does he bathe evermore in the miracle springs,
That his wings and his heart are in rhythm when he sings?
Tears moisten the harpstrings, they quiver with pain,
Then the triumph, the peace but the finest souls gain—
Earth's losses, its tears through the notes sweep along,
The longings of earth find a voice in the song,
Till outechoed by angels they find a release,
To be silenced henceforth, merged in infinite peace.

Will the spirit bird sing through the ages to come,
Or the soul take its flight and, still singing, go home,
And the world weep aghast when, the music withdrawn,
The lark still a-wing tells the rapture of dawn?

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GRAND CAÑON.

THE GRAND CAÑON OF THE COLORADO.

[From Major J. W. Powell's Report of the Exploration of the Cañons of the Colorado—1869.]

"FOR two years previous to the exploration, I had been making some geological studies among the heads of the cañons leading to the Colorado, and a desire to explore the Grand Cañon itself grew upon me. Early in the spring of 1869 a small party was organized for this purpose. Boats were built in Chicago, and transported by rail to the point where the Union Pacific Railroad crosses the Green River. With these we were to descend the Green into the Colorado, and the Colorado down to the foot of the Grand Cañon."

From the record of May 24, 1869, we quote the following:

"The good people of Green River City turn out to see us start—a party of ten men. We raise our little flag, push the boats from shore, and the swift current carries us down."

"Our boats are four in number. Three are built of oak, staunch and firm."

"We take with us rations deemed sufficient to last ten months, abundant supplies of clothing, also a large quantity of ammunition and two or three dozen traps."

On the 26th they go into camp at the foot of the Uintah Mountains, at the head of Flaming Gorge Cañon, the first to be explored.

We quote again: "The river is running to the south; the mountains have an easterly and westerly trend directly athwart its course, yet it glides on in a quiet way as if it thought a mountain range no formidable obstruction to its course. It enters the range by a flaring, brilliant-red gorge, that may be seen from the north a score of miles away."

"You must not think of a mountain range as a line of peaks standing on a plain, but as a broad platform many miles wide, from which mountains have been carved by the waters. You must conceive, too, that this plateau is cut by gulches and cañons in many directions, and that beautiful valleys are scattered about at different altitudes. The first series of cañons we are about to explore constitute a river channel through such a range of mountains. The cañon is cut nearly half-way through the range, then turns to the east, and is cut along the central line, or axis, gradually crossing it to the south. Keeping this direction for more than fifty miles, it then turns abruptly to a southwest course, and goes diagonally through the southern slope of the range.

* * * * *

"May 30.—This morning we are ready to enter the mysterious cañon, and start with some anxiety. The old mountaineers tell us it cannot be run; the Indians say, 'Water heap catch 'em;' but all are eager for the trial, and off we go."

"Entering Flaming Gorge, we quickly run through it on a swift current, and emerge into a little park. Half a mile below, the river wheels sharply to the left, and we turn into another cañon cut into the mountain. We enter the narrow passage. On either side the walls rapidly increase in altitude. On the left are overhanging ledges and cliffs five hundred, a thousand, fifteen hundred feet high.

"On the right the rocks are broken and ragged, and the water fills the channel from cliff to cliff. Now the river turns abruptly around a point to the right, and the waters plunge swiftly down among great rocks; and here we have our first experience with cañon rapids. I stand up on the deck of my boat to seek a way among the wave-beaten rocks. All untried as we are with such waters, the moments are filled with intense anxiety. Soon our boats reach the swift current; a stroke or two, now on this side, now on that, and we thread the narrow passage with exhilarating velocity, mounting the high waves, whose foaming crests dash

over us, and plunging into the troughs, until we reach the quiet water below; and then comes a feeling of great relief. Our first rapid run. Another mile and we come into the valley again.

"Let me explain this cañon. Where the river turns to the left above, it takes a course directly into the mountain, penetrating to its very heart, then wheels back upon itself, and runs into the valley from which it started, only half a mile below the point at which it entered; so the cañon is in the form of an elongated U, with the apex in the center of the mountain. We name it Horseshoe Cañon.

"Last spring, I had a conversation with an old Indian named Pa-ri-ats, who told me about one of his tribe attempting to run this cañon. 'The rocks,' he said, holding his hands above his head, his arms vertical, looking between them to the heavens—'the rocks h-e-a-p, h-e-a-p high; the water go h-oo-woogh, h-oo-woogh! water-pony (boat) h-e-a-p buck; water catch 'em; no see 'em Injun any more! no see 'em squaw any more! no see 'em pappoose any more!'

"June 7.—On a rock we find a pool of clear, cold water, caught from yesterday evening's shower. After a good drink we walk to the brink of the cañon, and look down to the water below. I can do this now, but it has taken several years of mountain climbing to cool my nerves, so that I can sit, with my feet over the edge, and calmly look down a precipice two thousand feet. And yet I cannot look on and see another do the same. I must either bid him come away or turn my head.

"This evening, as I write, the sun is going down, and the shadows are settling in the cañon. The vermilion gleams and roseate hues, blending with the green and gray tints, are slowly changing to somber brown above, and black shadows are creeping over them below; and now it is a dark portal to a region of gloom—the gateway through which we are to enter on our voyage of exploration to-morrow."

The 9th of June brought disaster to a boat containing three of the men, who were carried down the rapids, but all were rescued.

They pass the mouths of the Uintah and the White Rivers, with constantly changing scenes, making a tortuous journey through many dangerous rapids, much of the time between high, perpendicular walls.

On the 15th they pass around a great bend, five miles in length, and come back to a point one-quarter of a mile from where they started. Then they sweep around another great bend to the left, making a circuit of nine miles, and come back to one-third of a mile from where the bend started. The figure 8 properly describes the fourteen miles' journey. July 17 they arrive at the junction of the Grand and Green rivers, having traversed about eight hundred and four miles.

On the morning of July 19, the Major and a companion start to climb the left wall below the junction of the Grand and Green Rivers. They reach the summit of the rocks. The view is thus described: "And what a world of grandeur is spread before us! Below us is the cañon, through which the Colorado runs. We can trace its course for miles, as at points we catch glimpses of the river. From the northwest comes the Green, in a narrow, winding gorge. From the northeast comes the Grand, through a cañon that seems bottomless from where we stand. Away to the west are lines of cliff and ledges of rock—not such ledges as you may have seen, where the quarry-man splits his blocks, but ledges from which the gods might quarry mountains, that, rolled on the plain below, would stand a lofty range; and not such cliffs as you may have seen, where the swallow builds his nest, but cliffs where the soaring eagle is lost to view ere he reaches the summit. Between us and the distant cliffs are the strangely carved and pinnacled rocks of the *Toom-pin-wu-near Tu-weap*. On the summit of the opposite wall of the cañon are rock forms that we do not understand. Away to the east a group of eruptive mountains are seen—the Sierra La Sal. Their slopes are covered with pines, and deep gulches are flanked with great crags, and snow fields are seen near the summits. So the mountains are in uniform—green, gray, and silver. Wherever we look

there is but a wilderness of rocks; deep gorges, where the rivers are lost below cliffs and towers and pinnacles; and ten thousand strangely carved forms in every direction, and beyond them mountains blending with the clouds."

"Traveling as fast as I can run, I soon reach the foot of the stream, for the rain did not reach the lower end of the cañon, and the water is running down a bed of dry sand; and, although it comes in waves several feet high and fifteen or twenty feet in width, the sands soak it up, and it is lost. But wave follows wave, and rolls along, and is swallowed up; and still the floods come on from above. I find that I can travel faster than the stream; so I hasten to camp and tell the men there is a river coming down the cañon."

The exploring party next passes through Narrow Cañon, nine and a half miles long, Glen Cañon, one hundred and forty-nine miles in length; and Marble Cañon, sixty-five and one-half miles long. The depth of the last named is three thousand five hundred feet at the lower end. They emerge from Marble Cañon August 10, and find themselves separated from the Grand Cañon of the Colorado, the "Great Unknown," by the narrow valley of the Little Colorado.

The Grand Cañon is now entered and safely passed, a distance of two hundred and seventeen and one-half miles, terminating with the Grand Wash.

We are compelled to terminate this article abruptly for lack of space. It is proper to say that this journey has scarcely ever been equaled for daring and hardihood. Each time they descended a rapids, they were liable to come to a fall too great to shoot over, with walls so steep they could not be climbed, and rapids so swift as to prevent return.

The Grand Cañon, as one of the wonders of the world, is visited every summer by hundreds of tourists.

OPTIMUS.

BY REV. CHARLES COKE WOODS.

A glow-worm in the grass at night shed forth
Its feeble light, but darkness deepened fast;
The wee thing did its uttermost to banish night,
And that, forsooth, was truest toil, indeed,
Success in God's clear sight, though in man's view,
Obscured by things of sense, 'twas but defeat.

A fire-fly flashed its fitful light, while soft
The evening shadows fell, and clouds hid stars,
And veiled in black the gentle moon's bright face;
As if the night, like one afraid, would haste
To flee when lightning flashed from those small wings,
With courage high the insect gave its light,
Though all alone with none to proffer aid—
Nor sun, nor moon, nor star a single beam.

At last the dawn shot crimson up the sky;
The tiny toilers crawled away to rest,
And sweet, methinks, was their well-earned repose,
For each its place had filled, its task had done
In keeping with the great Creator's thought.

HOW THE EARTH WAS FORMED.

T. C. CHAMBERLIN,
Head Professor of Geology, University of Chicago.

JUST how the earth was formed at the outset is not certainly known. The most common view of men of science is that it was once in the form of a fiery gas. It is supposed that all the planets and satellites that now revolve around the sun were once a part of a common mass of gas in the form of a vast sphere which was very large and very hot. This gradually lost its heat and shrank as most bodies do when they cool. If it was not already whirling round at the outset it must have come to do so as it shrank, and as more and more of its heat was lost it rotated more and more rapidly. At length it came to whirl so fast that the outer part, which was moving fastest, could no longer be held down to the surface, and so it separated in the form of a ring around the equator of the great sphere.

The main mass kept on cooling and shrinking and whirling faster and faster and hence other rings separated. Each of these rings also kept on cooling and shrinking and is supposed to have parted at some point and gradually gathered together into a globe, but still in the form of fiery gas, even though it had lost much of its heat. But at last this globe of gas cooled so much that the main part of it became liquid. This was that part which afterwards became the solid part of the earth. It then had the form of lava. It was still too hot for the water to condense and hence it remained in the form of steam or vapor, forming a vast envelope all about the earth. There are supposed to have been many other vapors in the air at that stage, and it must have been very dense. But at length the globe of lava cooled so that the outer part crusted over, and this crust grew thicker and thicker as time went on. After a while it became cool enough to permit the water to condense on the surface and so the ocean began to be formed. The water grew in depth until nearly all the steam was condensed and many of the other vapors that had been in the air while it was so hot were condensed also. And this left the gases which cannot easily be condensed behind, and they formed the air much as it is to-day. And that is the way the atmosphere is commonly supposed to have come about.

But all this is theory. It cannot now be proved. But there are several great facts that fit in with it and make it seem as though it might be true. As wells and mines are sunk deep in the ground it is found that the earth grows warmer and warmer. Volcanoes pour out molten rock and this shows that it is very hot somewhere beneath them. Many of the mountains on the earth are really wrinkles in its crust, and it has been thought that these are caused by the cooling and shrinking of the globe. It is because these and other things fit in so well with the theory that most scientific men have come to accept it as probably true. It is known as the Nebular theory. But there are other ways of explaining all these things, and perhaps it may be proven that there are better ways.

Some scientists have supposed that the earth was formed by small masses or particles of matter gathered in from the heavens. On a clear night shooting stars may be seen quite often. These are little bits of stone or metallic matter shooting through space at high rates of speed, which strike the atmosphere and become hot. The earth also is moving at great speed—nearly nineteen miles per second. It is not strange then that when the little stranger collides with the earth it should "make the fire fly." Usually the outside is melted and carried away so fast that the little mass is entirely used up in a few seconds. It merely makes a little streak of light. But sometimes the

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Photogr·h by F. J. Haynes, St. Paul.

TERRACED ROCKS, YELLOWSTONE PARK.

PUBLIC LI
RENCE

mass is large enough to stand the waste and still reach the ground. In such cases it is found to be mainly stony matter and iron. No substance has ever been found in any of them which is not found in the earth. Only a few of these shooting stars or meteorites will be seen in looking at any one point in the heavens. But the earth is very large and there are many such points, and when these are taken all together it is found that the number of these little bodies which fall in a day is very large. It is estimated at twenty millions. But still they are small and do not add very much to the size of the earth. But as they are being constantly swept up from space and are growing fewer and fewer, and as this has been going on for a very long time, it is reasonable to suppose they may once have been much more abundant and that the earth then grew much faster by reason of them. It is thought by some that the earth may have grown up entirely by gathering them in, the idea being that it was itself once only a little meteorite that succeeded in gathering the others in. It is commonly supposed, however, by those who hold to this view, that the earth was formed from some special cluster of these meteorites that gathered together. It has been thought that perhaps the gas of the rings mentioned before may have cooled down into little solid particles before they were collected together and that they built up the earth. This brings the two theories together in a measure. The planet Saturn, you know, has rings of this kind and they are made up of small solid bodies, and not of gas or liquid, as was once supposed.

If the earth was built up this way we must account for the heat in the interior, but this would come naturally enough. As the little bodies fell upon the surface they would strike hot. But unless they came fast they would cool off before others struck the same spot and the earth would not get very hot. But as they gradually built up the surface the matter below would be pressed together harder and harder because of the growing weight upon it, and this pressing together would make it hot. It is figured out that it would become very, very hot indeed, though this might not seem so at first thought, and that the volcanoes and mountains may all be explained in this way quite as well, and perhaps better, than in the other way. This is called the Accretion theory.

It may be that neither of these theories is right, and we will do well to hold them only as possible ways in which the earth may have been formed at the beginning. But, at any rate, the earth has been shaped over on the surface. In a certain sense its outer part has been remade. And this concerns us more than the question of its far-off origin, because our soils, ores, marbles, and precious stones, as well as our lands and seas, are all due to this reshaping. In the deepest parts of the earth which we can get at for study, we find that it is made up of rocks of the granite class; not always granite proper, but rocks like it. What is below this in the great heart of the earth we do not know, except that it is very dense and heavy. Rocks of the granite class are formed under great heat and pressure, or by the cooling of molten rock material. They may be called the basement rock or great floor, on which all the other rocks near the surface are laid. They underlie all the surface, but at different depths. In some places they have been crowded up by the pressure that came from the shrinking of the earth, of which we spoke before, and so have come to be actually at the surface, except that soil, clay, sand, or gravel may cover them. Under about one-fifth of the land these rocks lie just below the clays, gravels, sands, and soils that occupy the immediate surface. Sometimes they come out to the actual surface, and may be seen in ledges or bluffs. But usually the soils, sands, gravels, and clays cover them up more or less deeply, but even then they are often struck in sinking wells.

Under the other four-fifths of the land they lie much deeper, often several thousands of feet, and there are spread over them sandstones, shales, and limestones. These are the rocks we usually see in the quarries and cliffs of the interior states. The materials to form these were taken from the older rocks of the granite class by a process

which is now going on—so we know how it is done. This is the way in which it takes place: The air and the rains and the water in the ground act upon the rocks, and cause them to soften and fall to pieces, forming soils, or sand, or little rock fragments. This material is gradually washed away by rains and floods. This does not usually quite keep pace with the softening; so the surface is covered with soil and other loose material. But it is little by little washed away, and carried down to sea, where it settles on the bottom, and forms layers of mud or of sand. The mud afterwards hardens, and becomes a kind of rock known as shale. The sands become cemented by lime or iron, or some other substance, and form a sandstone. The lime in the rocks that softened and decayed is chiefly dissolved out by the carbonic acid in the waters of the ground, and is carried away to the sea in solution. This lime is then taken up by sea animals to form their shells, skeletons, teeth, and other hard parts. Afterwards the animals die, and these hard, limy parts usually crumble more or less and form a bed of lime material, and later this hardens into limestone.

Some of the lime is also separated from the waters by evaporation or by other changes. You have noticed that on the inside of a tea kettle there gathers a stony crust. This is made of the same material as limestone—indeed, it is limestone. It was dissolved in the water put in the tea kettle, but as the water was heated and partly changed into steam it could no longer hold all the lime, and some or all of it had to be deposited. So, in a similar way, sea-water is dried up by the sun and air, and deposits lime, and so beds of limestone are formed. You will readily see from what has been said why shales, sandstones, and limestones take the form of beds lying upon each other.

Now, away back towards the beginning, when the ocean was first formed, and some part of the earth was pushed up so as to form land, this process began, and has been at work ever since. The surface of the land has been moistened by the air and moisture, and then has been washed away to the ocean and laid down in beds. When these grew thick, and were pressed by the weight of the newer beds that were laid down on them, they hardened into rock again. And this has gone on for a very, very long time, and the beds of sandstone, shale, and limestone so formed have come to be many thousand feet thick in some places. The land would all have been worn away down to the level of the sea if the earth had not kept shrinking and wrinkling, or pushing up in places.

At different times portions of what was once the ocean bottom have been lifted and have become land. If these beds are examined they will be found to contain shells and corals and other sea animals which were buried in them when they were forming, and thus it is known that they were laid down under the sea. It is found also that the lower beds contain kinds of life different from those above, and the lower beds were, of course, formed first. So, by studying the sea-shells and other relics in the beds, from the lowest ones up to the highest ones in the order in which they were formed, the various kinds of life that have lived in the sea from the beginning are found out. The life at the beginning was simpler than it is now, and quite different in many respects. There were gradual changes from time to time, and many strange creatures appeared that do not live at present.

RETURNING HOME.

GUY STEALEY.

I HAVE often wondered whether birds, like persons, do not grow to love some one locality better than all others, and if they do not return there year after year to make it their home. My belief is that they do. I have observed many cases that tend to confirm my views, and give a couple of them below.

One spring, six years ago, while my grandmother and I were out milking in the corral one evening, a pair of killdeer flew over our heads and, after circling around a few times, settled near us. We noticed then that the male had only one leg, the other being broken off near the knee. They skipped around in the way they have, stopping now and then to pick up a worm. All that summer they came nearly every night to catch the bugs and worms, which they often carried to the little fledglings in their nest by the lake.

Well, time passed on. Autumn came and went, and with it the killdeer and their young. The long winter wore away; then, on a bright spring morning, in precisely the same manner as before, our two friends, the killdeer, darted down in the corral again and went to feeding. The old fellow hopped about on his one leg as of yore, and seemed glad to see us again.

The next year it was the same way. They arrived at about the same time as on the two previous seasons, and hatched out their young as usual, down by the lake. They were quite tame by this time, and we began to regard them as pets.

The next spring, however, they failed to come, and you may be sure that we missed their clear, cheerful cries. We could not, of course, tell the cause of their non-appearance. One or both of them may have been killed or they may have died, as birds are liable to the same fate as we are; but one thing is certain, this pair came back here for three seasons.

Another summer, while passing near the river, a humming bird flew out of the bushes almost under my feet, and from its actions I felt certain it had a nest there. And sure enough, on stooping down and parting the leaves I found her nest, built on a single rose stem, projecting over the water. Two tiny birds reposed on their soft bed. Below this nest, on the same stem, and but a few inches apart, were two old ones. They were somewhat ragged, as was natural, from the war of the elements that had raged during one and two years. So, these humming birds must have made this their home for several summers.

THE PLANT PRODUCTS OF THE PHILIPPINE ISLANDS.

THE Department of Agriculture has recently issued a report on the plant products of the Philippine Islands, which is particularly interesting at the present time. The report deals with the agricultural resources of the islands as they now exist, and shows that although an agricultural country, the islands do not produce enough food for the consumption of the inhabitants. In order to supply the deficiency, it is the custom to draw upon rice-producing countries, such as Cochin China. About one-ninth of the area of the Philippine Islands, or 8,000,000 acres, is devoted to agriculture. When the natural fertility of the soil is considered and the large amount of rich land not yet cultivated, it can be assumed that with better agricultural methods the products of the islands could be increased tenfold. Rice forms one of the most important food products of the islands; more than a hundred varieties are grown; the annual production is about 36,000,000

bushels. This is, of course, far below thc actual requirements of the population, even when supplemented by other vegetables and fruits. Maize, next to rice, is one of the mort important of the grain products of the Philippines, and the sweet potato follows maize in turn. Fruits grow in great abundance, bananas heading the list. Large quantities of sugar cane are grown, but owing to crude methods of manufacture, the sugar is inferior in quality and is sold for a low price. Cotton is not as valuable a product for the islands as it once was, owing to the successful competition of British fabrics. Formerly indigo also was one of the important products of the islands. Coffee plantations thrive well, but the coffee is not of the best quality and the plantations are not well managed. In most of the islands of the archipelago tobacco is grown and over one hundred million cigars are annually exported from Manila. The shipment of leaf tobacco averages about 20,400,000 pounds. The islands also furnish spices and medicinal plants are abundant, but most of them are little known.

HONEY BIRDS.

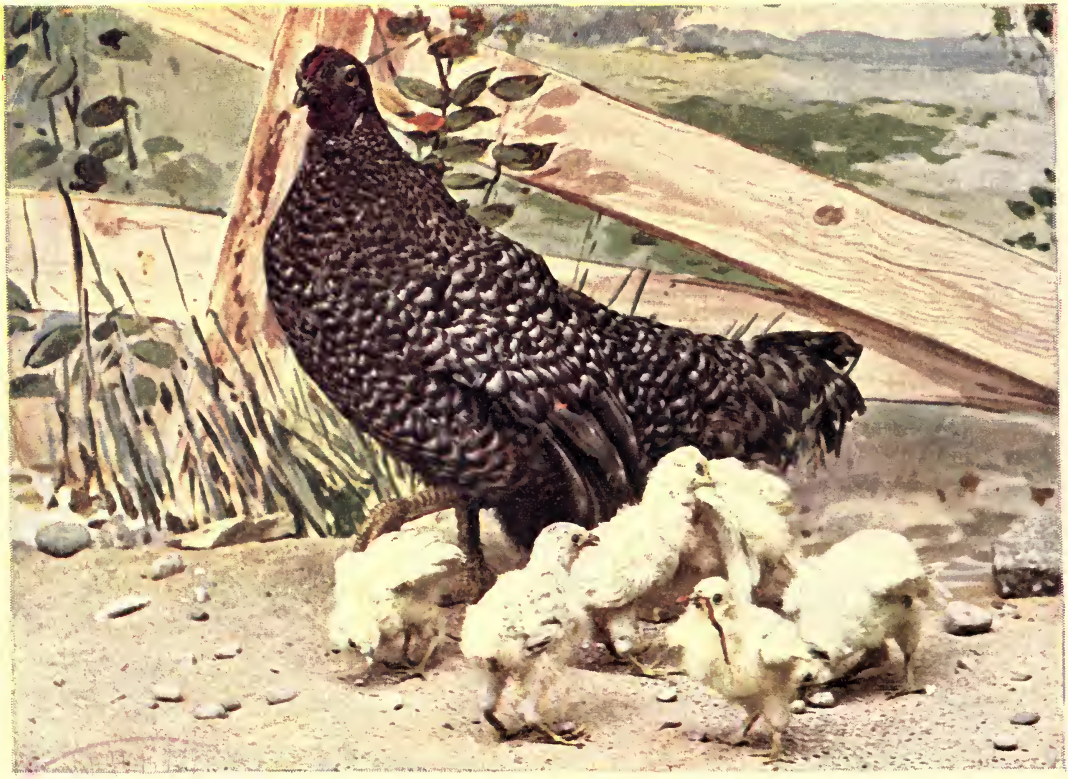
THERE are in Africa, Australia, and in South America certain birds, evidently not related ornithologically, that, because of their peculiar habits, are known as "honey birds," the special traits of which afford an interesting study in animal reasoning or instinct, as one may choose.

One of these, the species common to a large area in Central and South Africa, mentioned by many travelers, has been briefly described by that prince of realists, Dr. James Johnston of Brownstown, Jamaica, in his superb work, "Reality vs. Romance in South Central Africa," on page 106. He says: "Our daily meeting with the honey birds served to remove any skepticism I may have had in reference to this cunning little ceature. It is not much larger than a canary, and as soon as man makes his appearance hops from branch to branch, making repeated flights toward the traveler and then flying off in the direction in which it appears to wish attention attracted, with a sustained *chic-en, chic-en, chic-chur, chur*, returning again and again, until its opportunity is awarded by someone accepting its invitation to follow to the spot where is stored the —to it—inaccessible treasure. It makes a great fuss, flying round and round and round, leaving no doubt as to the whereabouts of its find. Sometimes there is no opening to be seen, when the native proceeds to tap upon the trunk with the head of his hatchet until he locates the hive. He then obtains the honey by making a fire at the root of the tree, and, under cover of the smoke, with his hatchet secures the prize. Then is revealed the reason for the excitement of our tiny guide, who now comes in for its share of the pickings."

Several explorers whose good fortunes have taken them well into the interior of the Australian bush have described the somewhat similar actions of a species of bird spoken of as being "nearly as large as a crow" and evidently quite distinct from the African species. In Haiti I have had opportunities of observing the like performances of a bird, shy and elusive for the most part and only at all approachable when the presence of honey renders it bold, which appeared to be closely related to our northern cedar bird. And, if an eye not specially trained in ornithology be not at fault, the same species is to be observed on the mainland, along the middle reaches of the Orinoco, in Venezuela.

October turned my maple's leaves to gold;
The most are gone now; here and there one lingers;
Soon these will slip from out the twig's weak hold,
Like coins between a dying miser's fingers.

—*T. B. Aldrich.*



ROOSTER AND HEN

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SILVER-SPANGLED HAMBURG.—These fowls are among the most highly developed of all the spangled varieties. They are valued as egg producers and rank among the best. They are very impatient of confinement and are said to succeed best when they can have the run of a clean pasture or common. A large grass walk is recommended by the most successful breeders. Six-foot fences, where they are intended to be restricted to certain limits, will not be more than sufficient for the safe custody of these chickens. The hens, if young, lay nearly throughout the year, but the eggs, which are white, are small, weighing about 1½ ounces each. As they are such abundant layers they seldom want to sit. The chickens are healthy and strong requiring no unusual care. When first hatched they are cream-colored. They feather early and the barred character of the penciled birds quickly appears. In the rapidity of their movements they are said to rival even the active little Bantams.

It has been observed that both sexes of all the varieties continue to improve in appearance after each moult until they are 3 years old. Birds of 1 year old have never attained to their full beauty, this being especially apparent in the more ample development of the tail-feathers of the cock as he becomes older. At from five to six months old they are fit for table use, their meat white, tender, and well-flavored.

The Silver-Spangled Hamburg, or Silver Pheasant, as it is commonly called there, is a breed that has for generations been known in England. In Lancashire this variety had been brought to a very high standard of excellence years before poultry shows were thought of, and, as Wright observes, all our modern skill and careful breeding have been unable to improve upon the old breed of Mooneys, as they were called, which were absolutely perfect in point of feather. The spangling, so large, round, and rich in color, was really something to be wondered at and shows a skill and enthusiasm in breeding which has about it something of the marvelous.

PLYMOUTH ROCK HEN AND CHICKENS.—In March, 1873, Rev. H. H. Ramsdell thus describes the origin of this valued fowl:

"Some thirty years since John Giles, Esq., introduced a fowl into this vicinity—Putnam, Conn.—called the Black Java. Its plumage was black and glossy, its size large, pullets sometimes reaching 11 pounds in weight. It was an unusually hardy bird, with a dark, slate-colored, smooth leg and the bottom of the feet yellow. The hens proved good layers and of extra quality for the table. I sold a few of these birds to a Mr. Thayer of Pomfret, of whom Mr. George Clark of Woodstock, Conn., purchased some he supposed the same. Mr. Clark, passing Mr. Joseph Spaulding's yard one day, noticed his fine flock of Dominiques and proposed bringing a few of his Javas over to cross with them to increase the size. Mr. Spaulding accepted the offer, and when the chickens were grown rejected the black ones and those with double comb, reserving to breed from only the single-comb birds, which retained the Dominique color, or near it. One of the first products from the eggs of this cross was a hen which weighed 9¾ pounds. We soon had a fine flock of them. The fowls were spread around the neighborhood and were much sought after, but had as yet no name. A gentleman asked me what I called them. I said 'Plymouth Rock.' The name passed from one to another and they were soon generally known by that name."

The general characteristics of the cock are: Comb single, upright, and neatly arched, notched, or serrated; body large and deep; back broad and short; breast deep, broad, and full; thighs large and strong; size very large, ranging from nine to twelve pounds; general shape massive, but compact; carriage upright and commanding.

THE GRAND CAÑON OF THE COLORADO RIVER IN ARIZONA.

PRIN. WM. I. MARSHALL,
Lawndale School.

THE Colorado River is pre-eminently "The River of Cañons." Formed in eastern Utah by the junction of the Green River, rising in northwest Wyoming, and the Grand, which has its sources in the mountain rim which walls in the Middle Park of the State of Colorado, not a mile of the Colorado River is in the state of Colorado.

About two-fifths of its nearly 2,000 miles, reckoning from the sources of the Green, which is the main stream, flows through cañons, the series culminating in magnitude and grandeur in the Grand Cañon of the Colorado in Arizona. In 1875, the Government Printing Office at Washington printed in a finely illustrated quarto volume of 291 pages, under the modest and unpretentious title of "Exploration of the Colorado River of the West and Its Tributaries, Explored in 1869, 1870, 1871, and 1872 Under the Direction of the Secretary of the Smithsonian Institution," the fascinating and graphic story of one of the most perilous explorations ever undertaken by man, and one whose origin and successful outcome were due to the scientific enthusiasm, the great endurance, the fertility of resources and the dauntless courage of Maj. J. W. Powell. Few men with two arms would have dared to enter upon, or could successfully have completed the task, and he had left his good right arm on a battle-field of our civil war.

In 1882, the United States Geological Survey, of which Maj. Powell was then director, printed Vol. II of its Monographs, being the "Tertiary History of the Grand Cañon District, by Capt. C. E. Dutton, U. S. A.," a sumptuous quarto of 264 pages, with maps and splendid illustrations.

These two books are, and must ever remain the great authorities on "The River of Cañons," and I shall only write briefly of the route to and scenic splendors of the Grand Cañon.

It is accessible from various points along the Santa Fe Railway, but most easily at present by a stage ride of seventy-three miles, at an elevation above the sea varying from 6,866 to nearly 9,000 feet, from Flagstaff, Arizona—a beautifully situated mountain town at the southern base of the San Francisco Peaks, a cluster of volcanic mountains, the loftiest of which rises nearly 13,000 feet above the sea, and some 6,000 feet above Flagstaff.

At Flagstaff is the famous Lowell Astronomical Observatory, and about it are many points of much interest, especially Walnut Creek Cañon, with its extensive ruins of the cliff dwellers' houses built midway up the face of the almost vertical cliffs.

The first and last thirds of the stage ride to the Cañon are through the great Conconino Forest of long-leaved pines —much scattered and with no underbrush—but commonly with splendid grass and unnumbered wild flowers covering all the open spaces between them.

The middle third is over a more desert region, but not destitute of grass, and with stunted pines and cedars growing on most of the ridges and hills along the way.

For the past two years there has been little rain and the route last July was much more dusty than when I went over it first in 1895, and deemed it one of the most enjoyable stage rides I had ever taken; but rains late in July made it much pleasanter when I returned in August, this year, for a third visit.

Along the whole seventy-three miles there is no lake, pond, river, creek, brook, rivulet, or rill, no running water except springs at two points many miles apart which have been piped into troughs for stock.

This absence of water over so wide

an expanse seems at first wholly incompatible with the splendid forests of stately pines, with some aspens and scrubby oaks interspersed, and the luxuriant grass and innumerable flowers.

They are kept alive by the moisture of the heavy snows of winter, and the coolness of the nights in the warmer months, checking the evaporation, and by occasional rains in summer, mostly in July and August.

We are promised a branch railroad in the near future from the main line of the Santa Fe to the Cañon.

All previous observations of cañons fail utterly to give any adequate ideas of the immensity and the splendor of this, "the sublimest spectacle on earth." No narrow crack in the earth's crust is this cañon, but a vast chasm 217 miles long, from five to twelve miles wide and from 5,000 to 6,000 feet deep, with a great river rolling tumultuously along its bottom, miles away from us as the crow flies, and nearly a mile below us vertically.

As there are very few places where it is possible to climb down to the river, one might perish from thirst while wandering along the brink of this cañon, and having in plain view at many points one of the greatest rivers of the west coast of America.

It is the only cañon on earth vast enough to have scores of mountains within it.

It is a double cañon, *i. e.* a cañon within a cañon.

The outer cañon is from 2,000 to 3,000 feet deep, and from five to twelve miles wide.

Its general direction is east and west, but the mighty river, which in ancient geologic ages eroded this vast abyss, curved, like all rivers, now this way and now that, so that each wall is recessed in mighty amphitheaters, between which comparatively narrow promontories or points run out from one to six miles into the cañon.

From the base of the mighty palisade which forms the walls of the outer cañon stretches a plateau 5, 8, 10, or 12 miles wide, to the equally lofty palisade which forms the opposite wall of the outer cañon, and somewhere near the middle of this plateau is sunk the inner cañon, another 2,000 to 3,000 feet deep, with a width at the top varying from one-half to three-fourths of a mile, and in its somber depths rolls the ever turbid Colorado, ceaselessly at its endless labor of cutting down the mountains and sweeping their ruins to the sea.

Scattered all over this plateau are the remains of what were once long promontories like the points on which we now walk or ride far out towards the middle of the cañon, but which have weathered so that they are now lines of hills and mountains.

Real mountains many of them are, for from their bases on the plateau, 2,000 to 3,000 feet above the bottom of the inner cañon, they rise 1,500 to 2,500 feet, nearly or quite to the level of the tops of the cliffs bounding the outer cañon.

Nearly all the length of the cañon is through sandstones, and limestones, and shales, resplendent with the colors which add so much to the beauty of Rocky Mountain scenery.

The almost uniform horizontality of stratification of these rocks demonstrates that the erosion of the cañon was little aided or affected by any violent upheavals or disturbances of the rocks.

We see clearly about twenty-five miles each way along the cañon, and somewhat indistinctly probably another twenty-five or thirty miles each way, and everywhere is the same indescribable splendor of color and of beauty of form.

It is a new "Holy City," and whether viewed from above, by a ride or walk along the edge of the cañon, or from the multitudinous turns and loops of the trail by which one can descend on horseback to the plateau and ride across to the edge of the inner cañon, whence a path enables us to safely climb on foot down to the river's edge, everywhere we seem to be gazing on the ruins of cities, palaces, towers, and temples, such as might have been builded by the gnomes and genii of the "Arabian Nights."

Speaking of these weather-sculptured buttes or mountains of bare and splendidly colored rock which stand within the outer cañon, Dutton says:

"Some of these are gorgeous pagodas, sculptured in the usual fashion, and ending in sharp finials at the summit. Others are the cloister buttes with wing-walls and gables, panels and alcoves. All are quarried out upon a superlative scale of magnitude, and every one of them is a marvel. The great number and intricacy of these objects confuse the senses and do not permit the eye to rest. The mind wanders incessantly from one to another and cannot master the multitude of things crowded at once upon its attention. There are scores of these structures, any one of which, if it could be placed by itself upon some distant plain, would be regarded as one of the great wonders of the world," and of the colors he says:

"The color-effects are rich and wonderful. They are due to the inherent colors of the rocks, modified by the atmosphere. Like any other great series of strata in the Plateau Province, the carboniferous has its own range of characteristic colors, which might serve to distinguish it even if we had no other criterion. The summit strata are pale-gray, with a faint yellowish cast. Beneath them the cross-bedded sandstone appears, showing a mottled surface of pale-pinkish hue. Underneath this member are nearly 1,000 feet of the Lower Aubrey sandstones, displaying an intensely brilliant red, which is somewhat masked by the talus shot down from the gray, cherty limestones at the summit. Beneath the Lower Aubrey is the face of the Red Wall limestone, from 2,000 to 3,000 feet high. It has a strong red tone, but a very peculiar one. Most of the red strata of the west have the brownish or vermilion tones, but these are rather purplish-red, as if the pigment had been treated to a dash of blue. It is not quite certain that this may not arise in part from the intervention of the blue haze, and probably it is rendered more conspicuous by this cause; but, on the whole, the purplish cast seems to be inherent. This is the dominant color-mass of the cañon, for the expanse of rock surface displayed is more than half in the Red Wall group. It is less brilliant than the fiery-red of the Aubrey sandstones, but is still quite strong and rich. Beneath are the deep-browns of the lower carboniferous.

"The dark iron-black of the hornblendic schists revealed in the lower gorge makes but little impression upon the boundless expanse of bright colors above."

OIL WELLS.

OIL IS found in Pennsylvania in oil-bearing sand-rocks, which are considered as the reservoirs in which the distilled product has found a permanent lodgment. The depth of the oil-sand or sand-rock in this state is from 800 to 1,900 feet. There are often several strata, one above the other, containing oil.

It is the uniform experience that the lightest oils are found in the lowest sandstones, while the heaviest oils are drawn from the shallowest wells; and as we approach the surface where it is gathered from the pools dug to the depth of only a few feet, it becomes sticky, semi-fluid, and finally a solid asphalt.

Man made no attempt to bore a deep hole through soil and rock, hundreds of feet down, to reach oil, until the summer of 1859. The first oil company was formed in 1854, with Mr. George H. Bissell at its head, which bored the first oil well in the summer of 1859 under the direction of E. L. Drake. It was about the middle of June that "Uncle Billy Smith" and his two sons arrived in Titusville, on Oil Creek, Pa., the scene of operations.

"The pipe was successfully driven to the rock, thirty-six feet, and about the middle of August the drill was started. The drillers averaged about three feet a day, making slight 'indications' all the way down. Saturday afternoon,

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OIL WELL.

CHICAGO :
A. W. MUMFORD, PUBLISHER.

August 28, 1859, as Mr. Smith and his boys were about to quit for the day, the drill dropped into one of those crevices, common alike in oil and salt borings, a distance of about six inches, making a total depth of the whole well sixty-nine and one-half feet. They withdrew the tools, and all went home till Monday morning. On Sunday afternoon, however, 'Uncle Billy' went down to reconnoiter, and peering in he could see a fluid within eight or ten feet of the surface. He plugged one end of a bit of rain-water spout and let it down with a string, and drew it up filled with petroleum.

"That night the news reached the village, and Drake when he came down next morning bright and early found the old man and his boys proudly guarding the spot, with several barrels of petroleum standing about. The pump was at once adjusted, and the well commenced producing at the rate of about twenty-five barrels a day. The news spread like a prairie fire, and the village was wild with excitement. The country people round about came pouring in to see the wonderful well. Mr. Watson jumped on a horse and hurried straightway to secure a lease of the spring on the McClintock farm, near the mouth of the creek. Mr. Bissell, who had made arrangements to be informed of the result by telegraph, bought up all the Pennsylvania oil-stock it was possible to get hold of, and four days afterwards was at the well."

This memorable strike ushered in the petroleum era. It now only remained to develop this "bonanza." The condition of things on Oil Creek in 1865 is given as follows: "The surface of the whole country was saturated with oil from the leaking barrels, the overflow and enormous wastage from the wells before they could be got under control, and from the leakage and bursting of tanks. The peculiar odor of petroleum pervaded everything; the air for miles was fairly saturated with it; nothing else was thought of; nothing else was talked about. Land was sold at thousands of dollars per acre. Fortunes were made and lost in a day. Oil companies with high-sounding names were organized almost without number, absorbing millions of money; many companies were formed without the shadow of a basis for operations, and many persons who were as covetous as they were ignorant, were drawn into the maelstrom of speculative excitement and hopelessly ruined. No parallel in the history of speculation in this country can be found, excepting, perhaps, that which occurred during the 'California gold fever' of 184c."

The Pennsylvania oil region and the Russian oil region are the two greatest centers of petroleum in the world. The latter has its center at Baku, on the Caspian Sea. The following interesting state of affairs at Baku in 1872 is given by Major Marsh:

"The afternoon was devoted to the great natural wonders of Baku, petroleum and the everlasting fires. At Surakhani the whole country is saturated with petroleum; on making a hole in the ground the gas escapes, on lighting which it burns for a very long while, one of the few spots on earth where this phenomenon can be seen. When there is no wind the flame is dull and small, but in a gale it roars and leaps up eight or ten feet. There are two naphtha refining establishments at Surakhani, the furnaces of which are entirely heated by the natural gas, which is collected as it rises out of the ground in an iron tank and led off by pipes. At night the whole place is lighted in the same manner, by ordinary gas burners attached to the walls. On returning home in the evening we saw the silent waste, lit up by various fires, each surrounded by a group of wild Tartars cooking their food by its heat.

"We shall have occasion further on to furnish more particular information respecting the enormous yield of the wells around Baku, and therefore in this connection only incidentally allude to the statement of the geographer, who notices the 'seven hundred oil wells' which have all been drilled, none of which shows any signs of exhaustion, and says that 'immense loss is caused by the ignorance of those engaged in the trade. Thus a well at

Balakhani, yielding 36 571 barrels of naphtha daily, ran waste for four weeks before reservoirs could be prepared to receive the oil.'"

A celebrated Russian scientist, after a visit to Baku in 1882, said: "Comparing results achieved in the two countries on one side and the average depth and total number of wells on the other, it may justly be stated that the natural petroleum wells of Baku, as far as our knowledge goes, have no parallel in the world."

The statement concerning the enormous yield from some of the wells of this district may well challenge our credulity. The following graphic description of the bursting forth of the great Droojba fountain is from an eyewitness and is given in the words of Mr. Charles Marvin: "In America there are over 25,000 petroleum wells; Baku possesses 400, but a single one of these 400 wells has thrown up as much oil in a day as nearly the whole of the 25,000 in America put together. This is very wonderful, but a more striking fact is that the copiousness of the well should have ruined its owners and broken the heart of the engineer who bored it after having yielded enough oil in four months to have realized in America at least one million sterling. In Pennsylvania that fountain would have made its owner's fortune. There is $50,000 worth of oil flowing out of the well every day. Here it has made the owner a bankrupt (on account of the damage done by the oil to surrounding property). These words were addressed to me by an American petroleum engineer as I stood alongside of the well that had burst the previous morning and out of which the oil was flowing twice as high as the Great Geyser in Iceland with a roar that could be heard several miles round. The fountain was a splendid spectacle and it was the largest ever known at Baku. When the first outburst took place the oil had knocked off the roof and part of the sides of the derrick, but there was a beam left at the top, against which the oil broke with a roar in its upward course and which served in a measure to check its velocity. The derrick itself was 70 feet high and the oil and the sand, after bursting through the roof and sides, flowed three times higher, forming a grayish-black fountain, the column clearly defined on the southern side, but merging into a cloud of spray thirty yards broad on the other. The strong southerly wind enabled us to approach within a few yards of the crater on the former side and to look down into the sandy basin from around about the bottom of the derrick, where the oil was bubbling and seething round the stalk of the oil-shoot like a geyser. The diameter of the tube up which the oil was rushing was 10 inches. On issuing from this the fountain formed a clearly defined stem about 18 inches thick and shot up to the top of the derrick, where, in striking against the beam, which was already half-worn through by friction, it got broadened out a little. Thus continuing its course more than 200 feet high, it curled over and fell in a dense cloud to the ground on the northern side, on a sand bank, over which the olive-colored oil ran in innumerable channels toward the lakes of petroleum that had been formed on the surface of the estate. Now and again the sand flowing up with the oil would obstruct the pipe or a stone would clog the course; then the column would sink for a few seconds lower than 200 feet, but rise directly afterward with a burst and a roar to 300 feet. . . . Some idea of the mass of matter thrown up from the well could be formed by a glance at the damage done on the south side in twenty-four hours; a vast shoal of sand was formed, which buried to the roof some magazines and shops and blocked to the height of six or seven feet all the neighboring derricks within a distance of 50 yards. . . . Standing on the top of the sand shoal we could see where the oil, after flowing through a score of channels from the ooze, formed in the distance or lower ground a whole series of oil lakes, some broad enough and deep enough in which to row a boat. Beyond this the oil could be seen flowing away in a broad channel toward the sea. This celebrated well, from the best estimates that could be made, gushed forth its oil treasure

at the rate of 2,000,000 gallons a day from a depth of 574 feet."

About the year 1858 oil was discovered in Berksville, Tenn., on the Cumberland River. It was called rock oil and was hawked about the streets as a sure cure for rheumatism. About 1866 there was a company formed to develop the petroleum then so-called. The transportation from Berksville to market was so dear that the company was unsuccessful. At Glasgow, twelve miles from Cave City, Ky., near the Mammoth Cave, there was a well, and a transportation trough was suggested by Mr. Geo. Northrup, which was never used. But the suggestion finally led up to the subsequent use of pipe lines for transporting the oil. The first oil used was at the head-waters of the Cumberland River. It was sold in a crude state and was not then used for illuminating purposes. A few years afterwards, when it was discovered in Pennsylvania, it was so used, although still in a comparatively crude condition. The price of oil was then about thirty-five cents a gallon at retail, or to the consumer. It has since been sold to the consumer at as low a price as seven cents a gallon.

The Standard Oil Company owned the first pipe lines that transported oil from the Pennsylvania oil fields to the seacoast. It was then and still is the only company that has furnished the best oil product. The American oil is said to be at least twenty-five per cent. superior to the Russian article. It is of a higher grade and commands, naturally, a higher price.

It is assumed that there must still be great quantities of oil in the rock formation of the earth. The substance is absorbed by the rocks where deposited and does not evaporate, therefore it would long ago have disappeared by absorption were it not that there must be vast areas of it still lying ready to be pumped to the surface.

The odor of the petroleum first discovered was similar to that of the cheap bituminous coal. In this respect there has been a great improvement, although there is yet room for the removal of what, to many, is a very unpleasant odor.

In the fall of 1865 the narrator, Mr. George Northrup, at that time a young Chicago business man, still living in that city, believing that vast fortunes could be made in the oil regions, caught the fever, and ascertaining that new fields were being developed in Glasgow, Ky., went there with $5,000 capital, intending to invest it, fancying that amount would be sufficient to buy oil land and develop the same. Arriving at Cave City, on the L. & N. Railway, he was lucky enough to get a seat on the stage coach that ran to Glasgow. The only public inn was filled to overflowing, and he was obliged, with others, to sleep on the office floor of the hotel. Two miles before reaching the town the odor from the wells in operation affected him to such a degree that he confesses that no bouquet of flowers ever seemed to him sweeter. After dining at the hotel he was approached by a score of speculators who inquired of him whether he desired to invest in oil territory, which was held at from $25,000 to $200,000 an acre. He said that he would investigate the next day, became disgusted and immediately disappeared. The principal objection to the territory was the absolute absence of transportation. It was then that he suggested the use of a trough for the transportation of the oil to Glasgow, a distance of twelve miles, since which time it has been carried by pipe from the oil fields of Pennsylvania to the Atlantic Ocean.

THE BADGE OF CRUELTY.

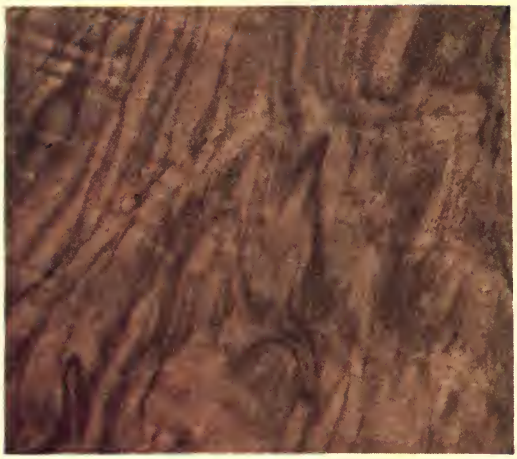
CELIA THAXTER.

IS it not possible to persuade the women of Boston—the city we are proud to consider a centre of refinement, reason and intelligence—to take a decided stand in the matter of the slaughter of birds, and protect them by refusing to wear them? We are fostering a grievous wrong out of pure thoughtlessness. A bit of ribbon, or a bunch of flowers, or any of the endless variety of materials used by the milliner would answer every purpose of decoration, without involving the sacrifice of bright and beautiful lives. But women do not know what they are doing when they buy and wear birds and feathers, or they never would do it. How should people brought up in cities know anything of the sacred lives of birds? What woman, whose head is bristling with their feathers, knows, for instance, the hymn of the song-sparrows, the sweet jargon of the blackbirds, the fairy fluting of the oriole, the lonely, lovely wooing-call of the sandpiper, the cheerful challenge of the chickadee, the wild, clear whistle of the curfew, the twittering of the swallows as they go circling in long curves through summer air, filling earth and heaven with tones of pure gladness, each bird a marvel of grace, beauty, and joy? God gave us these exquisite creatures for delight and solace, and we suffer them to be slain by thousands for our "adornment." When I take note of the headgear of my sex a kind of despair overwhelms me. I go mourning at heart in an endless funeral procession of slaughtered birds, many of whom are like dear friends to me. From infancy I have lived among them, have watched them with the most profound reverence and love, respected their rights, adored their beauty and their song, and I could no more injure a bird than I could hurt a child. No woman would if she knew it. The family life of most birds is a lesson to men and women. But how few people have had the privilege of watching that sweet life; of knowing how precious and sacred it is; how the little beings guard their nests with almost human wisdom and cherish their young with faithful, careful, self-sacrificing love! If women only knew these things there is not one in the length and breadth of the land, I am happy to believe, who would be cruel enough to encourage this massacre of the innocents by wearing any precious rifled plume of theirs upon her person.

Extract from Henry Ward Beecher's letter to Bonner on the death of the Auburn horse:

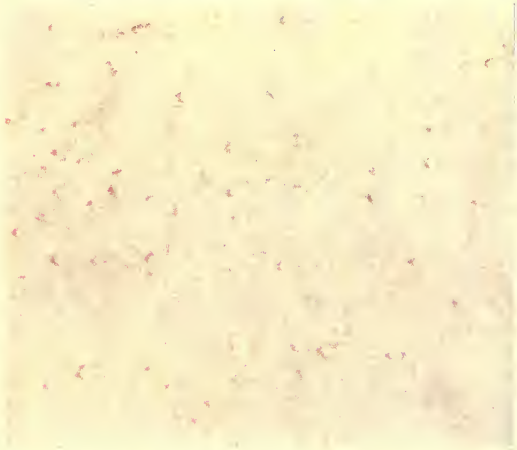
"Ought he not to have respect in death, especially as he has no chance hereafter? But are we so certain about that? Does not moral justice require that there should be some green pasture-land hereafter for good horses—say old family horses that have brought up a whole family of their master's children and never run away in their lives; doctors' horses that stand unhitched, hours, day and night, never gnawing the post or fence, while the work of intended humanity goes on; omnibus horses that are jerked and pulled, licked and kicked, ground up by inches on hard, sliding pavements, overloaded and abused; horses that died for their country on the field of battle, or wore out their constitutions in carrying noble generals through field and flood, without once flinching from the hardest duty; or *my* horse, old Charley, the first horse that I ever owned; of racing stock, large, raw-boned, too fiery for anybody's driving but my own, and as docile to my voice as my child was?"

Hungarian Ash.

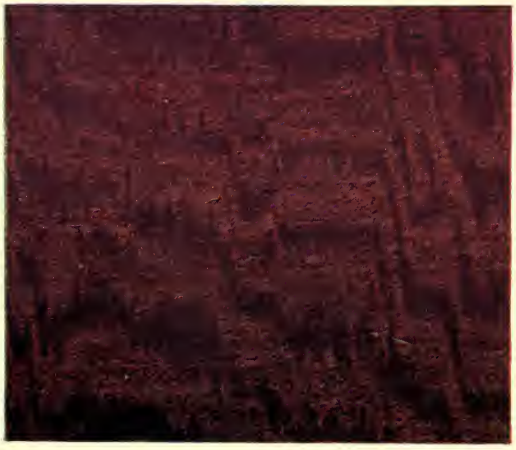


White Walnut.

Cherry.



Bird's-eye Maple.



Mahogany.

Oak.

CHICAGO :
A. W. MUMFORD, PUBLISHER.

POLISHED WOODS.

FINISHED WOODS.

ASH.—This name is applied to four species of forest trees. Most of the species are indigenous in North America, and some are found in Europe and Asia. The majority of these trees are large, affecting shady and moist places, banks of rivers, or marshes. The wood is tough and elastic, and is used by wheelwrights, carriage-makers, and shipbuilders. The Hungarian species is a favorite with cabinet-makers.

CHERRY.—The common cherry tree (*Prunus cerasus*) is of Asiatic origin, and is said by Pliny to have been introduced into Italy by Lucullus about seventy years before Christ, and about 120 years after was introduced into Britain. It is extensively cultivated in the timber regions of Europe and America. There are now more than 300 varieties. The wood is of a reddish hue, hard and tough, and much used by the cabinet-maker; the gum is edible, and the fruit is eaten either fresh or dried, and is used for preserves. The cherry is best propagated by grafting with seedlings of the wild cherry.

MAHOGANY.—This wood is a native of South America, Honduras, and the West Indies Islands, and among the most valuable of tropical timber trees. It is a large, spreading tree, with pinnate, shining leaves. The trunk often exceeds fifty feet in height, and four to five feet in diameter. The flowers, three or four inches long, are small and greenish-yellow, and are succeeded by fruit of an oval form and the size of a turkey's egg. The wood is hard, heavy and close-grained, of a dark, rich brownish-red color, and susceptible of a high polish. The collection of mahogany for commerce is a most laborious business, often involving the construction of a road through a dense forest, upon which the wood may be transported to the nearest water-course. The natives make this wood serve many useful purposes, as canoes and handles for tools. The largest log ever cut in Honduras was seventeen feet long, fifty-seven inches broad, and sixty-four inches deep, measuring 5,421 feet of inch boards, and weighing upward of fifteen tons.

Mahogany is said to have been employed about the year 1595 in repairing some of Sir Walter Raleigh's ships, but it was not used for cabinet work until 1720, when a few planks from the West Indies were given to Dr. Gibbons of London. A man named Wollaston, employed to make some articles from this wood, discovered its rare qualities, and it was soon in high repute.

WHITE WALNUT.—Walnut (the nut of Jupiter) is the common name of large nut-bearing forest trees of the genus *Juglans*, which, with the hickories, make up the walnut family, in which the trees have a colorless juice, a strong scented bark, and compound leaves. Three species of the walnut are found in the United States. The wood is hard, fine-grained, and durable.

BIRD'S-EYE MAPLE.—This is one of about fifty species, which are distributed over North America, Europe, Northern Asia, Java, and the Himalayas. While the wood of some of these is perfectly straight-grained, that in other specimens presents marked and often elegant varieties. The bird's-eye maple has its fibers so singularly contorted as to produce numerous little knots which look like the eye of a bird. It is a variety much valued for cabinet work of various kinds and interior finishing, while the straight-grained wood is used for making lasts, buckets, tubs, and other articles. It is also employed in ship-building.

OAK.—The English name of trees of the genus *Quercus*. Oaks are found over nearly the whole northern hemisphere, except the extreme north; in the tropics along the Andes, and in the Moluccas. All oaks are readily recognized by their peculiar fruit, consisting of an acorn with a cup which never completely encloses the nut. Some of the oaks furnish valuable timber. Tannic and gallic acids are obtained from them and the bark of many is useful for tanning. The nuts not only supply human food but that of various animals.

The species vary so much that the genus is puzzling to botanists. The character of the wood is affected by the soil and locality in which the trees grow, lumbermen making distinctions not recognized by botanists. The white oak is long-lived, and specimens supposed to have been in existence before the settlement of the country are still standing. It is of slow growth, but does not cease to grow as it gets larger. The oak is much esteemed as an ornamental tree. The names of some of the varieties are: Post oak, burr oak, swamp oak, live oak, black oak, willow oak, scrub oak, scarlet oak, and California evergreen oak.

THAT ROOSTER.

BY ELANORA KINSLEY MARBLE.

HE was a noble looking fowl, that rooster, and challenged my admiration by his unusual proportions, glossy plumage, and proud, exultant air.

As I paused in my walk to view him his sharp eyes were instantly fastened upon mine and a note of warning issued from his handsome throat. Away scampered the hens and young chicks, but the rooster, advancing a pace or two, lifted one foot menacingly, as if to defy my taking one step further.

"Dear, dear!" I exclaimed, "you make a great fuss over nothing. I only stopped to admire you and your family. Be assured I meant you no harm."

"*Gluck, gluck, gluck,*" replied he angrily.

The spectacle of a champion standing on one leg and sending forth such a cry of defiance struck me as so ridiculous that I involuntarily burst into laughter.

Every fowl in the inclosure at the sound stood motionless.

"What was that?" questioned one motherly old hen of another.

It was a queer gibberish which she spoke, and most people would have failed to understand it, but to me —who had been listening to the voices of nature the whole day long, to whom the trees had whispered their secrets, the brooks had murmured their complaints, the birds had caroled their stories—to me the language of these feathered creatures was perfectly intelligible.

"I don't know, I'm sure," replied the other, "but somehow it sounded rather pleasant."

"Pleasant!" exclaimed a young white and buff hen, tossing her pretty head, "it appeared to me she was making fun of us."

"Will you be quiet, you cackling old hens?" roared Mr. Rooster, giving them a swift glance from one eye, while furtively watching me with the other. "What business is it of yours what the intentions of this intrusive person may be? I am the one to decide that question. What do females know about war, anyway, especially hens? If she means fight, why——"

"You'll run, no doubt, and hide behind your wives," I interrupted, feeling the old fellow to be a boaster. "I've a notion to scale the fence and see," I added mischievously.

He stepped back a pace or two in evident alarm.

"Never fear," I hastened to say. "Only cowardly hearts find pleasure in giving pain to innocent and defenseless creatures. My only object in stopping was to view your happy family and— and— in fact, Mr. Rooster, to interview yourself."

"Interview me?" he exclaimed. "Well, I never!" and filled with a sense of his importance the old fellow set up such a crowing that even a Jersey cow, munching grass by the wayside, paused to ruminate over what it might mean.

"A reporter," sneered the ill-natured young hen. "A woman reporter! How unnatural!"

"Louisa Mercedes," sharply cried the rooster, "how many times have I told you to bridle your tongue?"

"I'm not a horse," sulkily replied

Louisa, "and what's more, I think if you would bridle your vanity it would be much more to your advantage. You want to do all the talking—and eating, too," she added in an undertone.

"She's but a young thing," loftily said Mr. Rooster, "and I have to overlook much of her insolence, you know. Another year will find her less spirited, like Georgiana and Marthena and Sukey over there. But let us resume our conversation. About what do you want to interview me?"

First, I should like to know—why, do you intend to come out?" I interrupted as he moved nearer the fence.

"Oh, no; but it's just as well that the women folks don't hear all we have to say. They have such a disagreeable fashion of contradicting, you know, and such good memories, that when you're least expecting it up they'll drag some remark made months ago to clinch an argument against you. Females are such queer creatures—but I beg your pardon," he added apologetically, remembering my sex. "I forgot."

"How many wives have you?" I queried, beginning the interview.

"Well," marking with his claws in the sand as he named over Louisa Mercedes, Cassie, Maud, and a number of others. "I have, as near as I can figure it, about nine now."

"Now?" I repeated.

"Yes. I had more the first of the season, but the folks up at the house have the habit of coming through that door in the barn yonder when the minister comes to dinner and carrying off any member of my family which strikes their fancy. I don't know what they do with them, I am sure, but presently I hear a dreadful squawk or two in the woodshed, a flouncing around, and then all is still. It is very painful, I assure you," and Mr. Rooster, lifting one foot, pretended to wipe a tear from his sharp, dry eyes.

"You defend them, of course," I responded, endeavoring to appear solemn.

"Of course," swaggered the husband and father, "and sometimes I crow as loud as I can for an hour or so afterward."

"Crow?"

"Yes, to let the folks know *I'm* not conquered."

"Haven't you," I asked, to hide my mirth, "a preference for some of your wives over others?"

Mr. Rooster gravely surveyed his household.

"No," he said reflectively, "no, I can't say that I have."

"But that white one," I said, "over yonder. She is so handsome."

"Maud, that white and silver Wyandotte, you mean. H'm, yes. She's *too* handsome. I have a great deal of trouble with her."

"Trouble—how?"

"Oh, in various ways," with a frown. "She is too pretty to work, she thinks, and spends half her time in preening her feathers, polishing her toe nails, or, what's worse, staring through the fence over yonder at that proud, long-legged Mr. Shanghai. He's a foreign bird, you know, and thinks himself a deal better than a common American Plymouth Rock. There's going to be trouble between us yet, mark my words."

"You have no trouble, I suppose with the older ones," I returned, suppressing a smile.

"No, not in that way, ma'am. They quarrel a good deal about their children, however. Sukey—that brown and white Leghorn over there—thinks her children are veritable little angels with wings, and Georgiana—an out-and-out Plymouth Rock like myself—says they are little demons, her own brood being the little angels, you perceive. Twenty times a day I have to chastise the whole lot, mothers and all. Indeed," with a sigh, "I have a notion to turn them all out some day, just to have peace. All, except Jennie, the black Langshan. She's old to be sure, but a great comfort to me."

"Of course, of course," sneered a voice behind him. "Precious little spunk has Jennie, scratching around from morning till night that she may turn up a bug or worm for a lazy old curmudgeon like you. So you intend to turn me out on the cold, cold world some day, do you? Hm! we'll see about that."

"That's Jane," grinned Mr. Rooster, without turning around, "I hope they

will choose her the next time they want one of my household, I really do."

"Oh, yes," sneered Jane, "you'll run away and squawk as you always do, and leave me to my fate."

"Run away," screamed Mr. Rooster making a dash for her, "I run away!"

"Fie, fie," I exclaimed, "you musn't show your valor by striking one of the weaker sex. You were intended to be her protector, you know."

I was here interrupted by a great commotion among the hens and chicks at the farther end of the enclosure.

"Only a quarrel, I presume," said he indifferently, "they can settle it among themselves, to-day."

"No, it seems to be something rather serious," I responded, and as I spoke a large cat succeeded in squeezing herself through the palings. Wildly ran the fowls about, cackling with fear.

"Hubby, hubby!" cried the hens.

"Papa, papa!" screamed the chicks.

"Run for your lives," admonished that hero, his knees knocking together, his comb and tail drooping, "run for your lives," and suiting the action to the word, away he scurried to the other side, and spreading his wings over the fence he flew, in his blind flight dropping at the feet of his hostile neighbor.

"Get out of here," screamed the young Shanghai, whom the handsome hen admired, "How dare you come over in my yard?"

"Give me time," meekly said my heroic Rooster, "give me time to gain my breath and I will."

"Now is my time," thought the young Shanghai, "the very chance I have been looking for," and straightway into the trembling Mr. Rooster he pitched.

From my standpoint I closely viewed the battle.

"Lo, the conquered braggart comes," I hummed, as a woebegone-looking object in a very little while dropped wearily over into our enclosure again.

"My poor dear," pityingly cried old Jennie. "Come, Sukey, let's lead him to the trough and bathe his wounded head."

I was about to depart, my heart wrung with compassion at the sight of his wounds, when, lifting his drooping head, with a ghastly wink of his uninjured eye, he said:

"Well!"

"Well!" I echoed in some surprise.

"Didn't I play that trick cleverly?" he asked with a sickly grin.

"Trick?"

"Yes, trick, you stupid! Couldn't you see the pretense I made of running away from the cat, just to get a chance of flying over the fence to get at that impudent Shanghai rooster?"

"But," I gasped, "you didn't whip him, you know."

"Didn't whip him!" he mimicked with brazen effrontery. "Why, how else, I'd like to know, could I have been torn up so? All I want now is a chance at that sneaking cat, and I'll make the fur fly, I warrant you."

Here the old deceiver, overcome with weakness and loss of blood, staggered, and would have fallen but for the support of the faithful Jennie and Sukey.

"Go away," hoarsely muttered the rooster, "go away; what do females know about war. They can't crow! Go away!"

I bethought me here of one very important question.

"I hesitate," I said, "to disturb a suffering creature, but—"

"Call to-morrow, Miss Reporter," he muttered wearily, "call to-morrow."

"But," I persisted, "you may not be alive to-morrow, and I only desire to know why you roosters invariably crow at midnight?"

"Midnight!" he echoed faintly, catching but the last word. "Is that the reason it has grown so dark? Ah, that Shanghai over there will get ahead of me; that'll never do," and the dying old boaster, drawing himself up stiffly, a feeble "*cock-a-doodle*" rang out on the air, but the final "*doo*" stuck in his throat, a gasp, a shiver, a swaying to and fro, and the long, slender toes of Mr. Rooster were presently turned toward the sky.

BROOK TROUT.

Salmo fontinalis.

THIS well-known and greatly prized game fish is found between the parallels of latitude 50 degrees north and 36 degrees south, though in Labrador, in latitude 54 degrees, and in the Appalachian mountain ranges as far south as the northern border of Georgia and South Carolina, it has been taken in abundance. Northwestern Minnesota is its northern limit, and it is only occasionally caught west of the Mississippi River, except in a few of its tributaries. Specimens weighing seventeen pounds have been taken, the largest being found in the Nipigon River, in Ontario, and on the north shore of Lake Superior, where the seventeen-pound specimen referred to was caught. It is found in the large lakes and in the smallest ponds, the tiniest brooks and the largest rivers. The Nipigon River is forty-five miles in length and has a depth, in places, of from one hundred to two hundred feet.

Although a bold biter, the brook trout is wary, and usually requires all the skill of an experienced fisherman to capture it. The bait commonly used to entice it to bite is artificial or natural flies, minnows, crickets, grubs, grasshoppers, fish spawn, or the eyes or cut pieces of other trout. Its period of spawning is from September to the last of November, and it begins to reproduce its kind when about two years of age, when it measures some six inches in length. In the early summer the trout sports in rapids and swiftly running water, and in midsummer finds a retreat in deep, cool, and shaded pools. In August and September the females gather about the mouths of gravelly brooks, whither they resort to make their spawning beds.

With age the habits of the trout change. When young they associate in schools and play together constantly, usually choosing parts of the brook where the bottom is muddy, in which, if startled suddenly, they bury themselves for safety. This does not often occur, however, as they prefer any little projection that juts out over the water where they can hide until the danger is past. As they grow older they separate, and each one chooses his own particular hiding-place, the larger trout taking the deepest holes and largest projections and leaving the smaller relations to shift for themselves. The older they grow the wiser and more wary they become, hence the necessity of considerable skill to land a wary old trout. Angle-worms are considered the best bait for trout, but in the spring, after the usual freshets, which wash vast numbers of worms and insects into the water, they bite better at the more tempting bait of a fly.

Practice alone will enable one to catch this wary beauty. One must know not only how to catch it but where to find it, and some knowledge of entomology is essential at the very beginning. It is desirable to have some acquaintance with the insects that live in the water, under the water, and over the water, and whose habits in great part influence the movements of the fish.

Miss Sara J. McBride, an accomplished naturalist of Mumford, New York, in an essay published some years ago in the *Forest and Stream*, taught the lesson of entomology we have referred to, as applied to the angler's purposes, in the following words:

"There is a large order of insects that live the first stages of life in water, where for weeks, months, in some instances years, they hide under stones; carve an abiding-place in submerged driftwood; feed on decaying vegetation in lazy, inert masses; burrow in the earth beneath the current; weave together

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bits of wood, gravel, stones, and floating debris, forming retreats that surround them as they swim or daintily walk; spin of silken thread individual domiciles that they guard from intruders with the valor of soldiers, or bodily and singly dash out in the current, swimming with agile rapidity. These are all fish food. But it is only when they assume the perfect form, when they cast aside their aquatic nature, and with gossamer wings float in the air, that they are of interest to the fly-fisher—as he seeks to deceive the finny tribe with their imitations, made of feathers, tinsel, and mohair. Insects are enfeebled at all changes in their life, and at each successive moult, when the pupa case is broken, too weak to keep guard, they flutter and rest on the water an instant before flitting away. At this instant many are seized by the wary fish. Insects leave the water mornings and evenings, particularly the latter, rarely at midday, never during rain storms or heavy winds. It is at these times, when they are leaving the water, their imitations are used to most advantage. It is that insect floating off into a new element that the fish are watching and waiting to feed on. At other times you may cast with success your favorite 'brown hackle' with its golden ribs and steel backbone—the bland professor, the modest queen of the water, or the grizzly king with his gray locks and flaming sword. Things which resemble nothing in the heavens above, the earth beneath, or the waters under the earth—why fish take these, whether from curiosity, or by way of dessert, no one perhaps will ever know, not fully understanding the nature of the fish. But there is one thing we do know, that when the countless myriads of these tiny creatures are entering a new life in untried regions, the favorite flies will be thrown in vain. The fish will regard with contemplative indifference every other lure but a close imitation of that particular insect.

"One evening we sat on the bank of a creek, bug net in hand, watching the trout and the birds of the air feeding on a neuropterous insect that is constantly repeating the cycle of its life,

'As yet unknown to fame,
And guiltless of a Latin name.'

The stream was in eddying whirls of ripples from the constant 'leaping' of the trout. Now and then one bolder than the rest would dash out of the water its full length to seize its departing prey, which sometimes escaped to become a precious morsel in the mandibles of a watching bird. Many of these insects would float on with the current, never able to unfold their soft, creamy wings, and become easy victims. On the opposite bank was an angler. For an hour in patience he whipped the stream, now up, now down, with 'red hackles,' 'white hackles,' 'black hackles;' he changed fly after fly in vain. At length he folded his rod and passed away among the shadows of the night, without so much as a bite, without so much as a chance to tell of the big fish 'hooked' but lost.

"There are many aquatic insects double brooded, or under favorable circumstances, of a succession of broods. Imitations of such can be used throughout the summer months. There are many insects that do not breed in water, yet are successful baits. As a rule, insects that appear in large numbers, whether they belong to land or water, are the proper ones for imitation. Solitary specimens, although dear to the heart of an entomologist, are eyed by the fish with haughty indifference. Water is a great attraction for all insect tribes. The banks of streams constitute the favorite hunting-ground for insect collectors, where they compete with the fish, those practical entomologists, in collecting. Some insects come to drink, others in search of prey, for insects are cannibals, while very many are the sport of the winds. It is probably the bright sheen of the water that draws the fluttering moths into its depths. All nocturnal insects have a strange infatuation for glistening light. What the attraction is for some is beyond the

ken of mortals. A *Tipulidæ bibri marci*, or in piscatorial language, the hawthorn fly, an insect whose life is beneath the surface of the earth eleven months of the year, comes crawling, creeping out of the ground on warm June mornings appareled in new livery. After resting awhile on low herbage, all, as if guided by one impulse, fly to the nearest stream. We have kept those insects for weeks in confinement, and they would neither eat nor drink. But every morning for hours they congregate over streams. Keeping time with the ripple of the water, they hold a May dance; darting hither and thither, occasionally touching the water to go down the current, or else down the throat of a fish.

When these bright creatures are holding high carnival above, the trout positively refuse other enticement. The larvae of moths is a favorite fish food, and consequently successful bait. Hibernating larvae are drawn from their retreats in warm spring days, and continue the pilgrimage they commenced the previous fall. In their wild journeyings on and on before spinning the pupa shroud, they fall victims in attempting to cross streams.

Hairy caterpillars feeding on the trees are blown off by the winds, or their silken thread is broken, as they hang under the leaves in shelter from the rain. Imitations of those known to the American by the familiar term of hackles are to be used after winds or during rain storms; also that compromise between larvae and image known as the hackle fly. No bait has ever been used that has given as general satisfaction as this anomaly. It is a common remark that fish will not bite before rain. The reason is probably that food is never offered at such times. The natural instinct of the insect forbids its leaving the water or flying abroad if rain is threatening. The breathing-pores are situated on the outside of the body near the insertion of the wings. They are soon clogged and closed up by the water, and the down washed from their bodies; their wings draggle and become powerless, and they suffocate flying in midair. This is the reason winged insects on touching water drown so easily. Insects do not invariably appear at the same times. A cold spring will retard their development for months, while an unusually warm spring or summer will hasten their appearance. Insects in the water are the most affected by changes of temperature. Any guide for a fly-fisher would be almost useless unless this important point were remembered. English works can never become positive authorities for our climate. Insects which appear there in vast quantities are rare here, and *vice versa.* Some that are single-brooded there are doubled-brooded here. Some that appear there in one month visit us at another, while we have many alluring baits here that the classic waters of the British Isles would regard with bewildering amazement."

In fishing with worm for bait, good fishermen say, it is better to choose a still, cloudy day indicating rain, as the fish are then hungry for insects. An expert trout-fisher will begin at the head of a stream and fish down it, always keeping some distance from the bank to avoid alarming the fish.

The speckled beauty, as the brook trout is universally called, as a food fish is by many considered unsurpassed, the flesh being firm and well flavored. Others, however, regard it as only an occasional delicacy.

CUBA AND THE SPORTSMAN.

DEER, WILD BOAR, AND MANY SPECIES OF GAME BIRDS FOUND IN ABUNDANCE —WATERS TEEM WITH FISH.

WHILE Cuba offers such a haven to the invalid, it is a paradise to the sportsman, wild game and fish of all kinds being abundant.

Parties of gentlemen on horseback, with their pack of hounds, hunt the fleet-footed deer. It is a common thing for a small party to kill eight or ten deer in a day.

The wild boar is plentiful, and sometimes, if cornered, dangerous, especially the old master of the herd, called "un solitario," which will tear a dog to pieces or make a green hunter climb a tree; but a Cuban easily kills him with a machete. The island boar sometimes weighs 200 or 300 pounds and has huge tusks, often five or six inches in length. The meat of the female is much relished by the natives. Wild dogs and cats, wild cattle, horses, and jackasses abound. But the jutia, peculiar only to Cuba, which looks like a cross between a squirrel with a rat's tail and a rabbit, and which lives in the trees and feeds on nuts and leaves, is the great delight of the Cuban.

Fowls are in great numbers. Wild guinea hens and turkeys are found in flocks of from 25 to 100. The whistle of the quail and the flutter of the perdiz, or pheasant, are heard on all sides in the rural and mountain regions. Ducks in abundance come over from Florida in the winter and return with the spring. Wild pigeons, with their white tops and bodies of blue, larger somewhat than the domestic bird, offer, in hunting, the greatest sport to gentlemen who will be restrained within reason. In the early morning the pigeons generally go to feed on the mangle berries when ripe, and which grow by the sea or near some swampy place. I have known a party of three persons to kill 1,500 of the pigeons within a few hours. Robiches, tojosas, and guanaros are found in the thick woods.

Mocking-birds and blue-birds, orioles, turpials, negritos, parrots, and a thousand kinds of songsters and birds of brilliant plumage flit from tree to tree.

The naturalist Poey says there are 641 distinct species of fish in the Cuban waters. Among those that delight the sportsman are the red snapper, lista, manta, gallego, cubera, surela, and garfish. The sierra, which weighs from forty to sixty pounds, is extremely game, as is the ronco, so called because it snores when brought out of the water. For heavy sport, fishing for sharks, which are good for nothing, or the gusa, which weighs from 400 to 600 pounds and is excellent eating, offers abundant exercise. It is a daily occurrence to see schools of fish numbering from hundreds to many thousands, each fish weighing from one to four pounds, swimming around the bays and harbors waiting for a bait. Any American who enjoys good fishing can find his fondest dreams more than satisfied in Cuba.

Delicious shrimps, crabs, lobsters, oysters, and clams abound. The lobsters have no claws and weigh from two to eight pounds. They are caught at night in shallow places along the sandy beach, a torch, harpoon, and net being the necessary outfit. Some of the rivers abound in alligators, but few hunt them.—*Field and Stream.*

NIAGARA FALLS.

CHICAGO :
A. W. MUMFORD, PUBLISHER

NIAGARA FALLS.

NIAGARA FALLS, the grandest cataract in the world, belong in part to the state of New York. Here the water of the great lakes, west of Ontario, is poured over a precipitous cliff about 160 feet high in two immense sheets, called the American and Horseshoe falls, separated by Goat Island. These falls received the name Niagara from the aborigines, Ni-a-ga-ra meaning the "thunder of waters." The roar created by the fall can be heard, under favorable conditions, at a distance of fifteen miles. There are three distinct falls. The Horseshoe fall, so named on account of its crescent shape, is the largest, covering a distance of 2,000 feet and having a fall of 154 feet; the American fall, 660 feet, and the Central fall, 243 feet in width, each have a fall of 163 feet. The volume of water is perpetually the same, no amount of rain or snow making any apparent change. This is conceded to be the grandest natural feature in the world, providing a water power the limit of which is incalculable.

Many of our readers have visited the falls in the summer season and doubtless all of them have read descriptions of them, more or less disappointing; everyone is familiar with the numberless photographs and engravings that have been made of them. Of course, no adequate idea of them has ever been given to the imagination. The writer has seen them many times and must confess to a want of sympathy with that feeling of wonder and bewilderment which many people claim to experience when first beholding them. It would be interesting to compile a list, if it could be done, of exclamations made on first viewing Lake Erie, as it really is, tumbling over a gigantic cliff. Charles Dickens is reported to have been unable to utter a word for many seconds, and there does not appear to be an adjective of sufficient potentiality to hold the idea of its majesty. And yet there are falls greater than these in the world. Dr. Livingstone, alluding to Victoria Falls in Central Africa, declared that of all the wonders of the lands he had visited he had seen no such stupendous spectacle as they. The chasm into which a mile-wide sheet of water plunges has been plumbed to twice the depth of Niagara.

The Niagara River is the channel by which all the waters of the lakes flow toward the Gulf of St. Lawrence. It has a total descent of 330 feet. The interruption to navigation occasioned by the rapid descent of the Niagara River is overcome on the Canadian side by the Welland Canal; on the American side the communication between tide-water and the upper lakes was first effected by the Erie Canal. The river flows in a northerly direction with a swift current for the first two miles and then more gently, with a widening current, which divides as a portion passes on each side of Goat Island. As these unite below the island the stream spreads out, about two or three miles in width, and appears like a quiet lake studded with small, low islands. About sixteen miles from Lake Erie the river grows narrow and begins to descend with great velocity. This is the commencement of the rapids, which continue for about a mile, the water falling in this distance about fifty-two feet. The stream terminates below in a great cataract. At this point the river, making a curve from west to north, spreads out to an extreme width of 4,750 feet. Goat Island, which extends down to the brink of the cataract, occupies one-fourth of this space, leaving the river on the American side about 1,100 feet wide and on the Canadian side about double this width. A cave, called the Cave of the Winds, is formed behind the fall, into which, on the Canadian side, persons can enter and pass by a rough and slippery path toward Goat Island. As already stated, there are many cataracts which descend from greater heights.

The sublimity of Niagara is in the vast power displayed by a mighty current flowing down the long rapids and finally plunging in one uniform sheet into the abyss below. Dangerous as it appears, the river is here crossed by small row-boats. For seven miles below the falls the narrow gorge continues, varying in width from 200 to 400 yards. The river then emerges at Lewiston, N. Y., having descended 104 feet from the foot of the cataract. A suspension bridge was constructed in 1855 by Mr. Roebling, for the passage of railway trains, and eighteen feet below the railway it also sustains a carriage and foot track. From this bridge a fine view is had of the falls. Other bridges have since been built, among them a cantilever.

Geologists say that the gorge through which the Niagara River flows below the falls bears evidence of having been excavated by the river itself. Within the present century changes have taken place by the falling down of masses of rock, the effect of which has been to cause a slight recession of the cataract and extend the gorge to the same distance upward toward Lake Erie. Table Rock, once a striking feature of the falls, has wholly disappeared. Father Hennepin made a sketch of the falls in 1678, a facsimile of which shows that many striking features have disappeared. In 1750 the falls were visited by Kalm, a Swedish naturalist, whose description of Niagara was published in 1751. He alludes to a rock having fallen down a few years previous and indicates the spot in his sketch. Lyell estimates the retrocession of the falls to be about a foot a year.

Of late years the extraordinary power of the falls has been adapted to the production of electricity, which has been distributed to various cities and towns within a radius of 100 miles. Street cars and machinery of every kind are run by them, and, by new devices and more powerful dynamos, it is believed the field for the successful utilization of this great force is almost without limit.

HOW THE WOODPECKER KNOWS.

How does he know where to dig his hole,
The woodpecker there, on the elm tree bole?
How does he know what kind of a limb
To use for a drum, or to burrow in?
How does he find where the young grubs grow—
I'd like to know?

The woodpecker flew to a maple limb,
And drummed a tattoo that was fun for him.
"No breakfast here! It's too hard for that,"
He said, as down on his tail he sat.
Just listen to this: rrrrr rat-tat-tat.

Away to the pear tree out of sight,
With a cheery call and a jumping flight!
He hopped around till he found a stub,
Ah, here's the place to look for a grub!
'Tis moist and dead rrrrr rub-dub-dub.

To a branch of the apple tree Downy hied,
And hung by his toes on the under side.
'Twill be sunny here in this hollow trunk,
It's dry and soft, with a heart of punk,
Just the place for a nest!—rrrr runk-tunk-tunk.

"I see," said the boy, just a tap or two,
Then listen, as any bright boy might do.
You can tell ripe melons and garden stuff
In the very same way—it's easy enough."

—*Youth's Companion.*

BIRDS AND ALL NATURE.
ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. VI. NOVEMBER, 1899. No. 4

A RARE HUMMING BIRD.

HOW ONE OF THESE LITTLE FAIRY CREATURES WAS TAMED.

P. W. H.

INSTANCES are very rare where birds are familiar with human beings, and the humming birds especially are considered unapproachable, yet a naturalist tells how he succeeded in catching one in his hand. Several cases are on record of attempts to tame humming birds, but when placed in a cage they do not thrive, and soon die. The orange groves of southern California abound in these attractive creatures, and several can often be seen about the flowering bushes, seeking food or chasing each other in play. "Once, when living on the slopes of the Sierra Madre mountains, where they were very plentiful, I accomplished the feat of taking one in my hand," says the naturalist.

"I first noticed it in the garden, resting on a mustard stalk, and, thinking to see how near I could approach, I gradually moved toward it by pretending to be otherwise engaged, until I was within five feet of it. The bird looked at me calmly and I moved slowly nearer, whistling gently to attract its attention, as I began to think something was the matter with it. It bent its head upon one side, eyed me sharply, then flew to another stalk a few feet away, contemplating me as before. Again I approached, taking care not to alarm it, and this time I was almost within reaching distance before it flew away. The bird seemed to have a growing confidence in me, and I became more and more deliberate in my movements until I finally stood beside it, the little creature gazing at me with its head tipped upon one side as if questioning what I was about. I then withdrew and approached again, repeating this several times before I stretched out my hand to take it, at which it flew to another bush. But the next time it allowed me to grasp it, and I had caught a wild bird open-handed without even the use of salt!"

One of the curious features of humming birds is that they are never found in Europe, being exclusively American, ranging in this country from the extreme north to the tropics, adding to the beauty of field and grove, being veritable living gems. Nothing can approach the humming bird in its gorgeousness of decoration. It is especially rich in the metallic tints, seemingly splashed with red, blue, green, and other bronzes. Some appear to be decked in a coat of mail, others blazing in the sunlight with head-dresses and breast-plates that are dazzling to behold and defy description. The smallest of birds, they are one of the most beautiful of the many ornaments of our fields and gardens.

In some islands of the south Pacific birds have been found that had never seen a man before, and allowed themselves to be picked up, and even had to be pushed out of peoples' way, it is said, yet they must have been very unlike the birds that are generally known, or they would have been more timid, even if they had not learned the fear of man.

THE LADY'S SLIPPER.

WILLIAM KERR HIGLEY,
Secretary of The Chicago Academy of Sciences.

THIS interesting plant belongs to that remarkable family of orchids (*Orchidaceæ*) which includes over four hundred genera and five thousand species. They are especially noted for the great variety of shapes and colors of their flowers, many of them resembling beetles and other insects, monkey, snake, and lizard heads, as well as helmets and slippers, the latter giving rise to the name of the plant in our illustration. The variety, singular beauty, and delicate odor, as well as the peculiar arrangement of the parts of the flower, make many of the species of great financial value. This is also enhanced by the extreme care required in their cultivation, which must be accomplished in hothouses, for the majority of the more valuable forms are native only in the tropical forests. Many, too, are rarely found except as single individuals widely separated.

There are many parasitic species, and in the tropics a larger number attach themselves by their long roots to trees, but do not obtain their nourishment from them, while those belonging to temperate regions usually grow on the ground.

In the last sixty years the cultivation of orchids has become a passion in Europe and, to a great extent, in America.

It is said that "Linnæus, in the middle of the last century, knew but a dozen exotic orchids." To-day over three thousand are known to English and American horticulturists.

Though admired by all, the orchids are especially interesting to the scientist, for in their peculiar flowers is found an unusual arrangement to bring about cross-fertilization, so necessary to the best development of plant life. It is evident also, as shown by Dr. Charles Darwin, that this was not so in the earlier life of the family, but has been a gradual change, through centuries, by which the species have been better prepared to survive.

No other family of plants presents as much evidence of the provision in nature for the protection of species and their continuance by propagation.

Few of the orchids are of economic value to man. The most important ones, outside of a few used in medicine, are the vanillas, natives of tropical America and Africa.

The lady's slipper belongs to the genus *Cypripedium* (from two Greek words meaning *Venus* and *a buskin*, that is, Venus' slipper).

There are about forty species found in both temperate and tropical countries. The one used for our illustration is the "showy lady's slipper (*Cypripedium reginæ* or *spectabile*) and is a native of eastern North America from Canada nearly to the Gulf of Mexico. It grows to a height of from one to three feet, and is leafy to the top. It grows in swamps and wet woods, and in many localities where it is extensively gathered for ornamental purposes it is being rapidly exterminated.

Those living before the era of modern investigation knew little of the functions of the various parts of flowers. We find an excellent illustration of this ignorance in the following peculiar account of a South American lady's slipper, written by Dr. Erasmus Darwin, father of Dr. Charles Darwin, in the latter part of the last century.

In his notes on his poem, "The Economy of Vegetation," he says: "It has a large globular nectary * * * of a fleshy color, and an incision or depression much resembling the body of the large American spider * * * attached to divergent slender petals not unlike the legs of the same spider." He says that Linnæus claims this spider catches small birds as well as insects, and adds: "The similitude of this flower to this great spider seems to be a vegetable contrivance to prevent the humming-bird from plundering its honey."

LAWRENCE, MASS.

A. W. MUMFORD, PUBLISHER, CHICAGO.

LADY'S SLIPPER.

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JIM AND I.

BY ELANORA KINSLEY MARBLE.

WOULDN'T the little readers of BIRDS AND ALL NATURE enjoy a talk with a mother-bird? The father-bird, it seems to me, has done all the talking hitherto. Because he is handsome and can sing is no reason why Jim, my mate, should write up the history of his family. It would have been a sorry attempt had he tried, I promise you, for though he is a Hartz Mountain Canary—pure yellow and white like the lower bird in the picture—he is not at all clever. My mistress says I have more sense in one of my little toes than Jim has in his whole body.

"You cute little thing," she exclaims when I kiss her, or take a hemp seed from off her finger, "you are the dearest and wisest little bird in the world."

Jim sometimes taunts me because I wear such sober colors—black and brown with green and yellow mixed—like the upper bird in the picture—but I retort that I am a Hartz Mountain bird, also, and have just as good German blood in my veins as he has. Neither of us ever saw the Hartz Mountains, of course, for we were born in Chicago, but our great grandmothers did, I am sure.

A good husband? No, I can't say that Jim is. He is too quarrelsome. My mistress says he is a bully, whatever that may mean. He has a fashion of standing by the seed cup and daring me to come and pick up a seed; the same with the drinking-water and the bathing-dish. Then again he is very gracious, and calls me pet names, and sings at the top of his voice every love song he knows. Sometimes I try to imitate him, when he flies into a rage and sharply bids me "shut up." I am too meek to return the compliment, even when I have grown weary of his music, but my mistress shakes her finger at him and calls him a "naughty, naughty bird."

She can't tame Jim, all she may do. Few canary birds will resist a hemp seed when offered on a finger. My mistress used to crack them between her teeth and coax and coax him to take one, but he never would. That's the reason she calls him stupid, for we love hemp seed just as you little folks love peanuts, you know. That's the way she tamed me, and that's the way you can tame your canary if you have one.

I have had a rather eventful history for a bird. In the first place—but let me begin at the beginning and tell you the circumstance just as it happened.

It was about four years ago, so far as I can recollect, that I caught my first glimpse of the world and tasted the sweets of freedom. One balmy morning in June, I escaped from my cage, and the window being open, out I joyously flew into the bright sunshine. I was a little dazzled at first and frightened. How immense the world seemed! How far away the tender blue sky over which the fleecy clouds sailed, that sky which I had thought a mere patch when seen from my cage in the window! How many houses there were, and how inviting the green trees and grass-plots! I fairly danced with joy, and chirped, "I'm free, I'm free," as I flew from place to place, my wings, never tiring, bearing me from tree to housetop and from housetop to tree.

Ah, that was a day never to be forgotten. How I escaped the dangers which lurk about the steps of the unwary and innocent has always been a marvel to me. The hostile sparrows, for instance, the green-eyed, sharp-clawed cat, the sling-shot of the cruel boy, the—but why linger over horrors which might, but did not happen?

In this way the morning passed joyfully, the pangs of hunger, as noon approached, however, advising me sharply it was near dinner time. From housetop to housetop I flew, from tree to tree, but nowhere could I find a little china cup filled with rape, hemp, and

canary seed, or a tiny glass vessel filled with water that I might slake my thirst.

What should I do? A bird brought up as I had been, I reflected, could never descend to work for a living, as the sparrows did, and other wild birds which I had met among the trees. Some of them ate insects—fact, I assure you—and one red-headed bird, wearing a coat of many gay colors, simply tapped and tapped on a tree with his hard bill whenever he wanted his dinner.

"Come in," said the bug, innocently, who was making his home between the bark and the tree, "come in."

Nobody appearing, the bug ventured out to see who his caller might be.

"Good morning," grinned the woodpecker, and then politely gobbled the poor bug up.

But I was not brought up that way. I could not eat bugs, neither could I rummage in the garbage boxes as the sparrows did. Oh, how unwise of me, and how ungrateful to run away from a home where my every need was faithfully served by a kind mistress. Like the prodigal I would return. Surely I would know the house, the very window from which I had fled. Yes, I would start at once, and off I flew in the direction which I thought I had come.

But, alas! how alike all the houses in that neighborhood seemed. Vainly did I fly down on many a window-sill and peer in. No mistress' face greeted me, no empty cage swung idly between the curtains. At length, faint from hunger and fatigue, I flew down and perched upon the railing of a porch where two ladies were sitting.

"You dear little thing," said one of the ladies—I want to say here that I am much smaller than the dark Hartz Mountain bird who sat for her picture —"I never saw a sparrow so tiny, or marked like you before."

"It's a canary, not a sparrow," said the other lady, "doubtless, somebody's lost pet," and she held out her hand, and chirped and talked to me very much like my lost mistress had done.

"Poor little wanderer," she at length said, as I looked at her, but made no effort to fly away, "I have an idea you came to us for food," and then she went into the house and shortly returned with a cage in the bottom of which she scattered seed, placing it upon the ground very close to me.

"Rape, hemp and canary," I chirped, "the seed I am used to," and down I at once flew, hopped into the cage, and, the next moment, was made prisoner.

Sorry?

Well, really I don't know. My period of freedom had been so brief, and attended with such anxiety and fear, that I hardly knew whether to laugh or cry. The next day, however, I knew that my lines had indeed fallen in pleasant places. My first mistress had been kind, but oh, how much more tender and thoughtful the new one proved to be!

"I was a helpless little creature," she said, "and upon her depended my entire comfort and happiness." Never for one day did she neglect me. Though my regular bill-of-fare was bird-seed, yet she varied it as she did her own. Cracker, lettuce, apples, grapes, cherries, sugar, and always in the summer, pepper-grass. If you little folks have a canary never fail, I beseech you, to give them of the latter all they want to eat. It costs nothing and may be gathered in any vacant lot fresh every day.

What pleasure so kind a mistress could find in keeping me in a little gilt cage, I could not see, for there were screens in the window, and even if there had not been I don't believe I should have cared to fly away. Something in my appearance one day suggested the thought to her, I am sure, for looking at me earnestly, she said:

"You are not happy, my birdie, I fear. Neither would I be, cooped up in a cage like that," and so she opened wide the door and out I flew, never to be a prisoner again—till, well, I will not speak of that just here, but keep it for the close.

What famous times we did have after that, to be sure. Whenever I felt lonesome down I'd fly upon the desk where my mistress sat writing. She would pretend not to see me till I had hopped upon the very sheet over which her pen was gliding.

"Why birdie!" she would then cry,

as though very much astonished, and off I'd fly, as she made a dash for me, to the window where I would hide behind the ruffle of the sash curtain.

"*Cheep, cheep*," I'd cry, just as you little folks cry "whoop," when all is ready, "*cheep, cheep.*"

"Where can my birdie be?" she would say after awhile, dropping her pen. "Where can she be?" and then she would look here and there, 'till presently approaching my hiding-place, out I'd fly, with a gurgle, into an adjoining room, where I'd again crouch behind the curtain. Between you and me I believe she knew all the time where I was hiding and only pretended to search for me here and there. Anyway it was capital fun, and I never tired of it, though mistress did.

"I can't play with you any more," she would say, "you quite tire me out," and then she would go to writing again and so our game of "hide and seek" would end for that day.

"Everything needs companionship," she said one morning to my master, "birds, children and men," and so that day he brought home a large wooden cage in which was as handsome a canary bird as you would want to see. That was Jim, and oh, how happy I was, when, a few days after, he asked me to be his mate. I said "yes," almost before he had got the song out of his mouth—I didn't know what a tyrant and bully he was till afterward, you know—and so we went pretty soon to housekeeping in the wooden cage.

My mistress understood what I wanted when she saw me picking up threads and pulling her chenille table cover to pieces, and so in one corner of the cage she put a nest made of wire and covered with a bit of muslin. Near by were little heaps of cotton-batting, wrapping-cord, and hair. Dear, dear, how busy I was for days! Jim, as I have said before, did nothing much but sing—and criticise. More than once I dragged all the furniture out of our wire home, because he thought I should have put the hair in first, and the cotton and strings in afterward. For a newly wedded couple, on their honeymoon so to speak, we did a vast amount of quarreling. The nest, however, was at last made cozy enough to suit us, and so one day I climbed in it and sat for quite a while. Then I called to Jim and I must say he seemed to be just as proud as I was of the little blue speckled egg which lay there so sung in the cotton. The next day but one I laid another, and then one every day till I had laid five. My, how I felt when I gathered them up close under me and sat down to brood. If all went well, after thirteen or fourteen days, we would have five dear birdlings. For fear the eggs might get chilled I left them only a few minutes at a time, hurriedly eating a few seeds, then back on the nest again. Jim could have helped me very much by brooding the eggs while I took exercise and my meals, but he was too selfish for that. All he did was to fly about and sing, bidding me to keep my spirits up. If it hadn't been for my mistress I should have fared badly, you may believe. She fed me crackers soaked in milk, cracked hemp seeds and placed them around the edge of the nest, besides other delicacies in the vegetable line too numerous to mention. When the birdlings were born Jim appeared to be very proud indeed. He couldn't sing long or loud enough, leaving me to feed the five gaping, pleading red mouths every day. Ah, no one knows better than a mother how much trouble and worry there is in bringing up a family. I'm sure I have had experience enough, for since that time I have had so many birdlings I can't count them. One season I had eighteen, three nests, and six in the nest each time. They were considered such fine birds that my mistress had no difficulty in selling them as soon as they learned to sing.

Now I am coming to a period the thought of which fills my heart with sorrow. For some reason that I am not able to tell you, my mistress concluded to part with me and Jim. She shed tears over it, I know, but nevertheless we felt ourselves being borne away one night, and in the morning, lo! we found ourselves in a large, bare room, on the floor of which was painted an immense ring or circle. I was sitting on six blue, speckled eggs at the

time, and didn't mind it so much, but Jim was very cross and restless, for the cage door was fastened and he bitterly resented imprisonment. Alas! from that time forth we never were to know freedom again; from that time forth we had to accustom ourselves to many, many changes.

About nine o'clock the door of the room opened and in came a little girl, followed by a little boy. Then more little girls and boys, till I counted, as well as I could, seventeen. All one family? Oh, no, I'm not talking about bird families now. As many as could crowded about the cage and stared at me with wide-open eyes. The cage was on a low table so they could peep into the nest. Oh, how frightened I was. One little chap thrust his finger through the bars, and down I flew, leaving my precious eggs exposed. That was what they wanted, and oh how they did exclaim! I went back pretty soon, however, for I began to understand that they did not mean to harm me or the eggs either. However, it was many days ere I got over the feeling of fright when stared at by so many eyes, but by the time the birdlings were hatched out I had grown quite used to it. Indeed I felt somewhat proud of the interest those wee tots took in my babies, my manner of feeding them never failing to call forth cries of wonder and praise.

"She just chews up the seeds and swallows 'em," said a little chap one day, "then when the baby birds cry for something to eat she brings it up and stuffs it down their long throats with her bill. My! it's ever so much better than a spoon."

The teacher laughed and patted the little fellow on the head.

"That is your first lesson in nature-study, Victor," said she, and then a lady at the piano struck up a march and off they all trooped two by two.

"Where do you suppose we are?" crossly said Jim, hopping excited y from one perch to another, "it looks like a lunatic asylum to me."

Jim, as I have stated before, is a very stupid bird. The words "lesson" and "nature-study" held no meaning for him.

"It seems to me," I said, watching the little tots marching with an observing eye, "that we are in a kindergarten."

"A kindergarten," echoed Jim, "what's that?"

"Why," I explained, "a school where young children are taught to love everything and everybody. Surely we have nothing to fear."

And so it turned out to be, a kindergarten, in which, I am proud to say, for purposes of nature-study I have raised many and many a brood.

WHY AND WHEREFORE OF THE COLORS OF BIRDS' EGGS.

THE why and wherefore of the colors of birds' eggs, says Ernest Ingersoll, has been a favorite theme for speculation, from the quaint surmisings of Sir Thomas Browne to the solemn guesswork of Shufeldt, in his ten "biological laws explanatory of the variation in color of the shells of the eggs in class Aves."* Hewitson piously concludes that the beauty of these elegant and often exquisitely attractive objects is intended for the delight of human eyes; hence, as he says, eggs simply white are put out of sight in holes! He also sees in the larger number of eggs laid by game-birds a provision by a benevolent Providence for the joy of the sportsman and the delectation of the epicure. Next comes a man who assures us that the colors of eggs are due to the influence of their respective surroundings on the imagination of the hen birds—the old story of Jacob's little trick on Laban in the matter of young cattle. This school instances as an example the red blotches prevalent on the eggs of falcons, regarded by it as a record of the bloody experiences of the parents; but it does not explain why the equally rapacious owls produce pure white eggs, or the bloodthirsty skuas and shrikes ay greenish ones. Other equally fallacious theorizings might be noted.

Library.

FROM KŒHLER'S MEDICINAL-PFLANZEN.

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TEA.

CHICAGO:
A. W. MUMFORD, PUBLISHER

TEA.

Camellia Thea Link.

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy.

The gentle fair on nervous tea relies,
Whilst gay good nature sparkles in her eyes.
—*Crabbe:* "Inebriety."

THE highly esteemed drink referred to in the above lines is made from the leaves and very young terminal branches of a shrub known as *Camellia Thea.* The shrub is spreading, usually two or three meters high, though it may attain a height of nine or ten meters. It has smooth, dark-green, alternate, irregularly serrate-dentate, lanceolate to obovate, blunt-pointed, simple leaves. The young leaves and branches are woolly owing to the presence of numerous hair-cells. The flowers are perfect, solitary or in twos and threes in the axils of the leaves. They are white and rather showy. Some authors state that they are fragrant, while others state that they are practically odorless. Stamens are numerous. The ovary is three-celled, with one seed in each cell, which is about the size of a cherry seed.

The tea-plant is no doubt a native of India, upper Assam, from whence it was early introduced into China, where it is now cultivated on an immense scale. It is, however, also extensively cultivated in various parts of India, in Japan, Java, Australia, Sicily, Corea, and other tropical and subtropical countries and islands. It is also cultivated to some extent in the southern United States, as in Carolina, Georgia, Mississippi, and California, but apparently without any great success. The plant is extensively grown in greenhouses and conservatories on account of its beauty.

According to a Japanese myth the tea plant originated as follows: A very pious follower of Buddha, Darma, vowed that he would pray without ceasing. He had prayed for some years when finally the Evil One overpowered him and he fell asleep. When he awoke he felt so chagrined and humiliated that he cut off both his eyelids and threw them from him. From the spot where they fell grew two plants endowed with the property of dispelling sleep. Chinese writers maintain that priests of Buddha introduced the plant from India. Some authorities are inclined to believe that the plant is a native of China; others, that it was brought from Corea to China about the ninth century.

Tea-drinking was supposed to have been discovered by a servant of Emperor Buttei, 150 B. C., but concerning this there is much uncertainty. It is said to have been in use in Japan as early as 729 of our era. The first definite information about tea-consumption in China dates from the year 1550, when a Persian merchant brought tea from that country to Venice. At a little later period we find tea mentioned in various letters and documents of travelers and merchants, yet it is evident that it was a costly and rare

article as late as 1660. In 1664 the East India Company presented the queen of England with two pounds of tea. In fact, it was not until the beginning of the eighteenth century and later that tea began to be used in different parts of Europe. During the latter part of the seventeenth century and the beginning of the eighteenth century tea-houses were established in various cities of Europe, especially in England. At the present time tea-houses, like coffee-houses, have become practically extinct in civilized countries, but that does not imply that tea-drinking and coffee-drinking are on the wane. Among the English and Slavs tea-parties are all the rage. The favorite Gesellschaft *Kaffee*, coffee-party, of German housewives indicates that they give coffee the preference. The biggest tea-party on record was doubtless the so-called Boston Tea Party, at which tea valued at £18,000 sterling was destroyed.

In spite of the tropical origin of the plant the largest quantities of tea are consumed in northern countries, notably in Russia and Asiatic Russia. Large quantities are consumed in England and the United States.

Most authorities are agreed that the different kinds of tea on the market are derived from the same species of plant. Some admit a variety *C. Thea var. viridis*. The following are the principal teas of the market and the manner of their preparation:

1. *Green Tea.* After collecting the leaves are allowed to lie for about two hours in warmed pans and stirred and then rolled upon small bamboo tables, whereupon they are further dried upon hurdles and again in heated pans for about one hour, accompanied by stirring. The leaves now assume a bluish-green color, which is frequently enhanced by adding Prussian blue or indigo. Of these green teas the most important are Gunpowder, Twankay, Hyson, Young Hyson, Hyson skin, Songla, Soulang, and Imperial.

2. *Black Tea.* The leaves are allowed to lie in heaps for a day, when they are thoroughly shaken and mixed. After another period of rest, two to three days, they are dried and rolled much as green tea. In the storing process the leaves undergo a fermentation which develops the aroma and the dark color. The following are the principal varieties: Campoe, Congou, Linki-sam, Padre Souchon (caravan tea), Pecoe, Souchong, and Bohe.

In some countries the teas are scented with jasmine flowers or orange flowers. This is, however, no longer extensively practiced. The essentially Chinese custom of coloring teas with Prussian blue, gypsum, and indigo is dying out, at least so far as the export trade is concerned, because intelligent civilized consumers are beginning to prefer the uncolored teas. Competent authorities maintain that there is not enough of the coloring substances added to be harmful. The workmen preparing the better qualities of tea are not permitted to eat fish, as the very enduring and penetrating fish-flavor would be transmitted to the tea in the thorough handling. It seems, however, that a more or less distinct fishy flavor is perceptible in many teas, even the better qualities.

Tea-dust consists of remnants from tea-chests, dust from the working tables upon which the leaves are rolled—in fact, tea-refuse of all kinds. It is certainly not a desirable article. Besides true tea there are leaves and other parts of a great variety of plants which have been used as tea. To enumerate and describe these would be impracticable in this paper. The following are a few of the more important: Paraguay tea, or maté, is highly esteemed in South America. The Coreans prepare tea from ginger. The poor Siberians use cabbage leaves. Teas are made from the leaves of a great variety of herbs which are supposed to have medicinal or stimulating properties similar to those of tea. Peppermint tea and chamomile tea are greatly esteemed in certain localities.

Concerning the adulteration of tea there seems to be considerable difference of opinion, some authorities maintaining that adulteration is common, while others maintain that it is very rare, indeed. There is, however, little doubt that used tea is frequently redried, rerolled, and resold as good

tea. Willow leaves, strawberry leaves, and mulberry leaves are said to be added occasionally.

Every housewife knows that *good* tea is expensive. Since the different teas are all from the same species of plant why should there be such a difference in price? The expensive teas consist of the very young leaves and terminal branches and are carefully dried and prepared under special supervision. The young leaves and branches have a more delicate flavor. To determine whether a sample of tea consists of young leaves or not soak it in water, carefully roll out the leaves, and measure them. If the majority of leaves measure an inch or more in length it is a poor quality. It must be remembered that even fair medium qualities are mixed; that is, they consist of mature and immature leaves. The best and most expensive teas are often sold at one hundred dollars per pound. They are never exported, but consumed by high Chinese officials. Imperial tea is prepared under the direct supervision of royal government officials.

Tea owes its stimulating properties to an active constituent known as thein, which is in all respects similar to caffein, the active constituent of coffee. The flavor which is developed by the drying process is due to several constituents. Besides these substances tea also contains considerable tannin. Tea consumed in moderate quantities is beneficial rather than otherwise. Its injurious properties are due to the tannin, which affects digestion. If consumed in large quantities for a long time the thein causes nervousness and the tannin causes various dyspeptic conditions. In China some chew the leaves treated with arsenic to improve the complexion. The whitening of the complexion is, however, due to the arsenic and not the tea.

Tea is prepared in different ways in different countries, nevertheless the preparation of a good cup of tea is comparatively simple, leaving out of consideration the many paraphernalia used by different nations and which really have no effect except that upon the imagination. The following is Emperor Kien Lung's (1680) recipe for making tea, and which is frequently found upon Chinese tea cups: "Over a moderate fire place a vessel with three feet, showing by its color and form that it has been much used; fill with clear water of melted snow and heat it until the water will turn a fish white or a lobster red. Pour this water into a cup containing the leaves of a select variety of tea; allow it to stand until the first rising vapors, which form a dense cloud, become gradually less and float over the surface as a faint mist. Drink this precious liquid slowly and thou wilt find it a powerful dissipator of the five sorrows which disturb our minds. The sweet and peaceful rest which we owe to this drink we may taste and feel, but may not describe." This recipe, although two hundred years old, has not been improved upon. Stated in a little simpler form the recipe would read: In a cup with good tea leaves pour clean boiling water and allow to stand five or six minutes; decant and drink slowly.

Tea leaves should never be infused for a long time for several reasons. The flavor dissipates and the objectionable tannin is more and more extracted, imparting to the tea astringency and a bitterness, which are not only disagreeable to the taste but also cause indigestion and constipation. After the tea is prepared as indicated it may be taken hot or cold, with or without sugar, with or without cream or milk. Iced tea, with a little lemon juice added, is a delicious drink for hot weather. It is cooling besides having a tendency to check excessive perspiration. Tea has also been found valuable as a wash for inflammation of the eyes.

In conclusion, I wish to refer the reader to an article in the July number of the *Cosmopolitan* on "Tea-drinking in many lands," by Laura B. Starr, in which are related many interesting customs relative to the use and preparation of tea.

Explanation of plate: *A*, flowering branch, nearly natural size; 1, flower in section; 2, stamen; 3, ovary in transverse section; 4, pistil; 5 and 6, fruit, with seed; 7, seed; 8, seed in sections.

THE TOWHEE; CHEWINK.

(*Pipilo erythrophthalmus.*)

BY LYNDS JONES.

THE home of my childhood and early youth nestles in one of the gems of woodland which are so characteristic of the rolling prairies of central Iowa. This hundred-acre grove covers five main hills, with their valleys and the lesser runs which divide each of the five hills into two, three, or four lesser hills. The hills radiate in a semicircle to the north and west from the height on which the old home stands, rolling away to the creek which bathes their feet. Here are tall, heavy woods, without underbrush, covering the north slopes; lower, more open woods with patches of plum, and wild crab apple trees, with some hazel brush on all lower slopes of the hills; and finally a liberal fringe of low, brushy trees—hawthorn, plum and crab apple trees—and dense hazel brush on the uplands and on lower lands away from the creek. This dense growth also fringes the county road which extends from end to end of the grove, and it was from this roadside that towhee first heralded his arrival from the south, during the bright days of late March or early April. Later, when the frost had left the ground, and his mate was growing anxious to be selecting a nesting-place, he might be seen on the topmost twig of one of the taller small trees in every brushy place on every hillside. I have sometimes wondered if the towhee household did not have some disagreement about the family name, for the male, from his elevated perch loudly calls *towhee-e-e-e*, while his spouse on the ground below no less vigorously reiterates *che-wink*. But if danger seems to threaten his lordship quickly descends to join his mate in earnest warning that this small bit of earth belongs by right of discovery to che-wink. How earnestly both birds emphasize their claim by the nervous fluff of the short, stiff wings and the quick spreading of the long tail, as if the large patches of white at its end would startle the intruder away. But the male bird does not always confine himself to the iteration of the name he seems to love so well. Instead of the single first syllable there may be two or even three, no two in the same pitch. It has been a surprise to me that persons unfamiliar with the towhee's song do not realize that the two parts proceed from the same bird. To them the first part seems to resemble some part of the wood thrush's song and the last part—the *he-e-e-e*—the rattle of downy woodpecker. My ear persistently renders the whole song, *towhee-e-e-e*, or *towhe-hee-e-e-e-e*, or *O towhe-he-e-e-e-e-e*. Others render it *chuck burr pilla-will-a-will*. But towhee is not limited to this variety of vocalization. Besides the abbreviation of his *che-wink* alarm note to *swink*, or even *wink*, and a *chuck, chuck*, when the nest is threatened, he sometimes sings a rarely beautiful ditty which is totally unlike any of his other performances. I have heard it only shortly after his arrival from the south, before his mate had joined him, and have tried in vain to describe it. The bird moves slowly and sedately about among the fallen leaves in a soliloquy over the happenings of the long journey just ended, with apparently no thought of the absent mate. The manner of its utterance indicates that this is the bird's private song, egotistic if you please, while his tree-top rendition is evidently his altruistic performance.

The ordinary song and call and alarm notes are well rendered in the local names bestowed upon the bird: Towhee, chewink, joreet, joree, charee, pink-pink, and wink-wink. His chestnut-colored sides and lowly habits have given him the names of ground robin and swamp robin, and his red iris, red-eyed towhee.

Nesting begins about the first of May in northern Ohio. The nest is almost always placed on the ground, often in a slight depression made by the birds, rarely in a bush up to seven feet from the ground. It is made of

MURRY,
MASS

A. W. MUMFORD, PUBLISHER, CHICAGO.

TOWHEE.
½ Life-size.

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material easily accessible in the region of the nest, of dry leaves for a foundation upon which plant stems, dry grass, grape-vine bark, or like material is arranged, and the whole lined with fine rootlets. The material will vary somewhat with locality and situation of the nest, as a matter of course. Rarely the nest may be covered, with the entrance in the side, but it is usually not covered. The nest site is preferably some distance from a road or foot-path, often in moderately deep woods where there is little underbrush, but more often in the shrubbery fringing the woods, either on a hill-top or side hill or bottom land. Here at Oberlin, Ohio, I have found more nests in the low second growth near swampy places than elsewhere.

The nest complement is from three to five eggs, usually four. The egg seems to be a rather rounded ovate, running to nearly spherical on the one hand to elongate oval on the other. The ground color is white, not seldom tinged with pink or blue, with sprinkling of reddish-brown dots, spots, and blotches. It is a common experience to find eggs of the parasitic cowbird in nests of towhee. Twice I have found nests on which the mother towhee was serenely sitting with four eggs of the cowbird beneath her and none of her own. Two eggs of the cowbird and two or three of the towhee in a nest are common. Sometimes the parasitic eggs so closely resemble those of the parent that it is not easy to distinguish between them, but often the difference is very marked.

The towhee is a fairly common inhabitant of the whole region east of the Rocky Mountains and north to the northern border of the United States, breeding everywhere north of northern Alabama.

WEE BABIES.

ELLA F. MOSBY.

THE past summer I saw the most charming baby-bird of my life. He was so tiny and silvery, his upper feathers such a lovely olive-green and the under plumage such soft white, and over the bright, innocent little eyes a beautiful curving line like an eyebrow. I did not at first recognize him, but the next day I saw two, probably of the same flock, hunting very industriously over an old tree, and I knew they were the young red eyed vireos. Their feathers were all new and fresh, and that made them look so silvery and the tints seem so clear.

The same summer I became very well acquainted with a different set of bird-babies. They were still younger, for their feathers had a soft, downy look, and fluffed out so that they really looked larger than their tiny parents. They were silver gray, the little blue-gray gnat-catchers, and nothing could be more charming than the way they twinkled about the bushes, or turned somersaults in the air to catch flying insects on the wing. Their little songs, as low as whispers, their call-notes "like a banjo-string" *ting!* and even their low scoldings, were very pretty, and seemed to belong to them perfectly. Someone, who did not know birds very well called them little wrens, and they really had a good many of the restless movements and alert attitudes of these birds, but their habits are totally different. For instance, their life begins in a lichened cup high up among the top boughs and it is only in the late summer, when birds break their rules and go as they please for a brief holiday time before the migration, that you will see the gnat-catchers come down to the low bushes. I can hardly believe it myself, but I once saw a young one picking away on the ground.

One charm about the tiny birds, gnat-catchers, chebecks, vireos, kinglets, and the like, is that they are not usually so shy as large, handsome birds, and I have often had them almost within touch, singing, feeding, preening their feathers, in the loveliest and most confiding way.

WISH-TON-WISH.

EMMA M. GREENLEAF.

ONE bright May morning Wish-ton-wish sat on the mound in front of his family burrow. Wish-ton-wish was a lively young prairie-dog and he wanted to talk with someone.

Presently Madam Talky came out of her burrow and ran up to the top of her mound.

"Good-morning," called out Wish-ton-wish; but Madam Talky did not even turn her head his way. I dare say she thought to herself, "Humph! A chit of a fellow like that isn't worth my time."

Now Wish-ton-wish was an only boy in a family where there were five other children, so that he had come to believe, as only sons often do, that he was wise enough to talk with a very Solomon of prairie-dogs. The silence of Madam Talky didn't hurt his feelings in the least. Presently he called out again and this time with greater tact: "How are your charming daughters this morning?"

O, you should have seen the change in Mrs. Talky. She turned her whole face toward Wish-ton-wish now and fairly beamed upon him.

"Very well, indeed, thank you," she answered; "you must call to see us."

And this time I dare say she thought to herself, "Why, I can hardly realize that the young fellow is about grown up; how fine he looks, too; his family must have great confidence in him to let him be sentinel when he is so young."

Wish-ton-wish thanked her politely for the invitation, and said that perhaps he might call that afternoon.

"Have you heard that Mr. Grizzle Prairie Dog has been found?" asked Madam Talky.

"No, where?" said Wish-ton-wish.

"O, in a very strange place," madam answered.

"It was Mr. Talky that found him. At least we feel pretty sure that he did. It was this way: Mr. Talky often has attacks of dyspepsia, and last night he ate so much timothy hay for his supper that he had to run back and forth in our burrows for exercise, ever so long before he went to bed. He put his head out at the end of the longest burrow to see if the moon was full and there stood two boys with a gun and a dead hawk. He heard them say they wanted the hawk for a 'collection.' Then one of them said, 'Wish we could have shot it before it caught that prairie-dog.' Mr. Talky was so dreadfully startled that he whirled round and fairly flew back through the burrow to his nest, but we feel sure it was Mr. Grizzle that the hawk had caught."

"How many enemies our race has!" said Wish-ton-wish with a sigh. "Have you told Mrs. Grizzle the sad news?"

"Yes, I told her before sunrise this morning; but she's got used to it now and doesn't feel so bad. He had been missing two days, you know. I saw her going after clover with Mr. Reddy Prairie Dog. You remember Mrs. Reddy was eaten up by a coyote last week."

"Dear me, dear me," sighed Wish-ton-wish again, "how many enemies our race has!"

Just then there came a warning yelp from a sentinel some distance away. Madam Talky and Wish-ton-wish and every other prairie-dog in sight echoed the yelp and then each one of them leaped into his burrow like a flash.

They must have turned a double-quick somersault, for, like another flash there were the little heads and bright eyes looking out at the very openings where their tails had vanished an instant before. Scores of curious little faces were peering out and their owners were anxious to know what made the first prairie-dog call out, "Danger, danger!"

Again came several quick calls from the distant sentinel; then all the little animals disappeared into their burrows.

No, not quite all of them. Way over on Last street there was an exciting scene. Mr. Silence Prairie Dog sat upright in front of his door fairly shaking all over with anger. His body shook, his tail shook, his head shook, and he yelped and barked—turned and popped into his burrow—turned again and popped out of his burrow in the same instant, and acted like one going crazy.

No wonder! Crawling slowly along through the short, dry grass, came a large rattlesnake. Nearer and nearer it glided to the door of the burrow. When it was almost there, Mr. Silence Prairie Dog keeled into his house, the snake slid after him, and then silence fell.

That night the village heard the rest of the story—how Mr. and Mrs. Silence Prairie Dog bit at the rattlesnake with their sharp teeth and scratched at him with their sharp claws, but could not drive him out of their nest where lay two baby prairie dogs. These two he ate for his dinner and then lay down in the deep, soft, warm nest of dried grass. How Mother Silence crept back after a long time and found the greedy old snake lying dead. Yes, truly; killed by the fierce bites of Mr. and Mrs. Silence.

Now all these sad affairs made young Wish-ton-wish quite blue.

Besides, when he went that afternoon to call on the Talky misses, he found that the plumpest one had gone after timothy with another young fellow. All at once he made up his mind that life was a failure and that he would run away from home.

When the prairie-dog folk found out that he was gone they were very sorry. They felt sure he had been eaten by some bird of prey or by a sly coyote.

"He was so wise and so handsome and so brave," said his mother; "there was no young fellow in the village who could be named in the same day with Wish-ton-wish."

Most everybody praised him now that he was dead, or now that they thought he was. I wonder if it isn't rather a poor plan to wait until people are dead or far away before we say the kind things that might have made them happy when they were near?

"We must not neglect our duties even in sorrow," said the father. "It is going to rain. Let us go out and put our mound into good order so that the water may not run into our burrows." They worked with a will, and found out, as everyone always does, that nothing helps sorrow and trouble so quickly as hard work.

When morning came the very first one to be out of a burrow was Wish-ton-wish's mother. Perhaps she had not slept any all night.

She went up to the top of the mound, then stood still with astonishment and joy; for there, on the other side of it, was Wish-ton-wish, hard at work. He was patting and smoothing the sides and making them even after the rain.

"O, where have you been all night, Wish-ton-wish?" cried his mother.

"I went over to the next village; I thought they might not have so many troubles as we have and perhaps I'd stay. But they have even more, mother; they have snakes and hawks and owls and coyotes and *men*, for yesterday some *men* came there with a great tank of water and poured five barrels into one burrow. They said they were making an 'experiment.' Of course they couldn't drown anybody because the burrows run down and up in every direction. So I thought I'd come home again."

"My son," said his mother, "you have learned a wise lesson. It is of no use to run away from trouble, hoping to find a place where there isn't any. Trouble comes everywhere; and so does happiness."

"Yes, mother; I believe it," said Wish-ton-wish, and he looked with soft eyes over toward the burrow of the plumpest Miss Talky.

THE BEE AND THE FLOWER.

MRS. G. T. DRENNAN.

VIRGIL, in his "Pastorals," beautifully alludes to the industry of the bee in culling its sweets from the flower. Perhaps we do not definitely know more of the mystery of the flower's secreting the nectar, and of the bee's making the honey, than was known in ancient times. There are differences of opinion on the subject. Darwin considers the honey secreted by the nectary to be the natural food with which the stamens and pistils are nourished. Others assert that the only use of honey with which flowers are supplied is to tempt insects, which, in procuring it, scatter the dust of the anthers and fertilize the flowers, and even carry the pollen from barren to fertile flowers. Linnæus considered the nectary a separate organ from the corolla; and every part of the flower which was neither stamen, pistil, calyx, nor corolla, he called a nectary; but what he called nectaries are at present regarded as modifications of some part of the flower; in some cases a prolongation of the petals, and in others an inner row of petals, or modified stamens adhering to the corolla. The term disk is now applied to whatever appendages appear between the stamen and pistil, formerly called nectaries. The form of the honey sac, or nectary, differs with different flowers. In the lily it is a mere cavity, or gland. In the honeysuckle a golden fluid is secreted at the end of the tube, without the sac. Few things in nature can be more beautiful than the nectary and the honey drops in the crown imperial. Each one is a shallow cup and pearly white. From each cup hangs a shining drop, like a tear. The tint of the cup gives the drop its hue and each one looks a splendid pearl fastened in the crown of each of the flowers of the crown imperial which, hanging down, only display the pearly honey drops when we look up into the flower. The buttercup is one of the most interesting flowers that secrete nectar. It belongs to the *Ranunculus*, or crowfoot family, which numbers many wild and some of the choicest of cultivated flowers. The nectar-cups are under the petals, and the mission of the flowers seems to be to feed the bees. It is well known that beyond the realm of romance and poetry the buttercup is a plant abhorred by the cow that gives the milk that makes the butter. The lovely yellow color of the buttercup no doubt suggested the name. Apiarists know that certain kinds of flowers make certain grades of honey. They know also that while the bee makes its honey from the flower, it will also make honey from sugar and molasses. The drainings of molasses casks are given the bee for winter food, and it is one of the unsolved mysteries how the bee makes its honey. The nectar in the flower is not honey. The bee makes the honey from what is abstracted from the flower, and also preserves life and makes honey from sweets that are given it for food. Buckwheat is an example of dark, rich honey and white clover and raspberry blooms of clear, translucent honey. Also the fact is, that abstracting the nectar in no wise impairs the beauty nor the fruitfulness of the flower. Instance the rich, productive buckwheat, how profusely it yields its flower; and raspberries ripen sweet and juicy from vines that have had the bees hovering over the snowy blooms from the time they open till the berries form. Honey bees are not always safe in their selection of flowers to feed upon, for Xenophon, in his "Retreat of the Ten Thousand," describes the honey of Trebizond as having produced the effect of temporary madness, or drunkenness, upon the whole army. Mr. Abbott, writing from the same country in 1833, says he witnessed the same effects of honey upon those partaking of it as Xenophon describes.

This would indicate that the honey undergoes some chemical change in the making, as the bees, in these instances, were not injured by the flowers, yet the honey they made from them was injurious to man.

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CANARIES.
Life size.

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THE CANARY.

(*Serinus canarius.*)

C. C. M.

THIS favorite singer and cage bird is a native of the Canary Islands, Madeiras, Azores and other small islands near the western coast of Africa. The islands are in the latitude of Florida and the climate may be said to be of a tropical character, though varied by lofty mountains. The canary in its native habitat is chiefly found in the mountainous districts, often several thousand feet above the level of the sea. The wild birds mate about the latter part of March. The nest is built in the tall trees of the evergreen species, frequently in the tops of these trees, and never less than eight or ten feet from the ground. We have seen it stated that they build on the ground, but this has been found to be an error.

The first canaries known to Europeans were brought from there by a merchant ship trading with the Canary Islands as a part of her cargo, several thousand of these birds having been trapped in the hope that they could be sold for a good price as song-birds. The ship was wrecked near the coast of Italy, but by the thoughtfulness of a sailor the cage containing the birds was opened and the birds liberated. They flew at once to the nearest point of land, which happened to be the island of Elba. The climate was so propitious that the canaries multiplied rapidly. In a very short time their superiority as songsters attracted attention and their domestication followed. The shipwreck referred to occurred early in the sixteenth century. The Italians were the first to breed these birds, and they were by them shipped to Russia, Germany, Belgium, and England. They were first described in an English book on natural history in 1610. The rage for breeding the canary with home birds became curiously popular and resulted in a curious intermixture of colors. In Italy they were bred with the citril and serin; in Germany with the linnet, green finch, and siskin. Mr. C. N. Page says, in his "Feathered Pets," a very valuable book for bird fanciers, that in an English book published in 1709 there are twenty-eight varieties of canaries mentioned, comprising nearly all those known at the present time and some which have become extinct. The climate has also had much to do with the change of color in these birds. The canary, which in its native home at Teneriffe is almost brown, becomes yellow and sometimes nearly white after being bred a few years in France, and it has been observed by naturalists that the winter fur of animals and feathers of birds become thicker and lighter in color in proportion to the coldness of the climate which they inhabit.

In England and Germany canary societies have existed for upwards of a century, and annual shows or exhibitions are held with prizes offered for the best birds.

Of the many varieties of canaries the most popular in the United States is the German. It is smaller than the English canary and is a much finer singer, being bred and trained for song and not for size. They are called Hartz Mountain canaries, and experts consider them the most satisfactory bird for the people. They are bred by the peasants in ordinary living-rooms high up among the Hartz Mountains of Germany. These birds are even more hardy than the American-bred canaries. They are brilliant singers. We had one for five years, and while its voice was wonderfully clear, full, and musical, it was too loud and was not admired

by our neighbors. The shrill and piercing note of some of this species renders them somewhat objectionable as house pets. The birds are happy in the cage, require very little care, and if properly attended to are said to be free from diseases. Most of the Hartz Mountain canaries are somewhat mottled with dark, greenish-brown, though many of the birds are clear yellow, and few have crests. In the canary-breeding section of Germany, almost every family keeps a few cages of these birds, or has a room devoted to their breeding. The German people are very fond of birds and there are many of them in the United States who have many cages of rare specimens.

Milwaukee supplies the United States with the bulk of the Hartz Mountain canaries, and there is no great crime in the deception, for the Milwaukee bird is really an improvement on the imported article, having just as fine a voice and being much hardier.

Experience has shown that the imported singer loses the power of transmitting his voice to the young after passing through an American winter. This is the case also, it is said, with Tyrolean singers who come to this country, their voices losing the peculiar yodling quality when they have been here a year. The native canary is hardier than the imported one, and, with proper training, is every bit as good a singer.

Before they are mated the hen birds are kept in separate cages in the music room, carefully fed and made to listen to the music of the singers and the machine used in training their voices. In this way the hen is enabled to transmit the best musical quality to her offspring. The music-room is a large one, with a south exposure, and is kept with the same scrupulous neatness as the breeding-room. In the corner of this room is the bird organ, and with it the little birds are given their vocal training.

When the machine is started the notes emitted are wonderfully like the song of the untutored canary. These notes are known to bird-trainers by the term *pfeiffen*. Gradually the whistle strikes onto a different line. It is an improvement over the *pfeiffen*, and is called the *klingel rolle*. A higher step still is called the *klingel*, and a still higher step *hohl klingel*. Lastly comes what is called *hol rollen*, and a bird whose voice has been developed up to that point is worth $50 in the market any day.

In this country there are only three importers of canaries. Each of these firms employs "bird-pickers" who travel over the mountains in Germany and gather together a supply of birds which are selected from the stocks of the small breeders.

There are several varieties of English canaries. The Norwich is a general favorite. It takes its name from the city of Norwich, where for generations it has been bred and cultivated. It has a brilliant, deep, reddish-yellow plumage. It is regarded as the most beautiful of all the canaries. Its color is frequently so dark that it is called the red canary. This color is produced artificially by feeding them during the moulting season a large amount of cayenne pepper mixed with hard boiled egg and cracker crumbs.

Canaries have many pretty ways and can be taught many pretty tricks. One that belonged to the writer had been deprived of its feet. Its wing feathers never grew out, hence it could not fly or perch and was obliged to stump about on the floor like an old veteran on his crutch. But it was healthy and vigorous, and so pugnacious that on our return, after the day's absence, it would fly at us, or try to, poor thing, and peck our outstretched fingers, even while taking offered hemp seed greedily. The bird watched and waited for our coming and we became so much attached to it that its death was a real loss.

> The little birds can fill our hearts
> As full as larger creatures' arts.

The nest of the canary is a pretty, neatly formed structure of any soft material it can find. Five bluish eggs are usually laid, and three or four broods are raised between February and September, though the female will sometimes persist in building until much later.

THE PAROQUET.

"I AM SO SORRY," wrote a little girl from Tarrytown, N. Y., to the editor of BIRDS AND ALL NATURE, "not to find in your magazine any more the bird-talks to the little folks. I used to read them with so much interest. Are there to be no more of them?"

Other little folks have written to the editor in much the same strain, so that this month the paroquet will speak for himself.

"From my photograph," he says, "you will notice that I am fond of gay dress, green, blue, yellow, orange-chrome, and red being my favorite colors. From my brilliant coat you would judge me to be a tropical bird, but I'm not. I was born and raised in the United States, as was my family, therefore I am an American citizen.

"In appearance I greatly resemble my cousin, the glib-tongued parrot, but for some reason, though my tongue is thick and short like his, and my bill as charmingly curved, I cannot talk—that is, not to be understood by the human family, I mean, for among ourselves we keep up a very lively conversation, in very loud tones—a mark we think, as do some other folk, of good breeding. On the other hand there are people unreasonable enough not to like it, and they say we 'scream' and that our notes are 'ear-splitting' and that, though we are beautiful to look upon and extremely docile, our voices render us undesirable as cage birds or pets. The idea! As though we do not consider that very fortunate!—for a cage is a prison, no matter if the bars are gilded. For my part I prefer to be free even if I do have to hustle for a living and, between you and me, I think that a bird that can screech and doesn't screech when shut up in a little cage doesn't deserve to live. He ought to be killed and stuffed and set up in a museum for people to gape at. Don't you think so, too?

"It is a great pity, but we paroquets are fast being exterminated. In some regions, where less than twenty-five years ago we were very plentiful, not a paroquet is now to be seen. We were once quite common in Ohio, Indiana, Illinois, Pennsylvania, and other parts of the United States. We are now to be found, in diminished numbers, in remote localities only of the lower Mississippi Valley and the Gulf States and in some regions of Florida. To escape from our enemy, the plume-hunter, we make our homes in practically uninhabitable regions. That is a long word for you little folks, but spell it out slowly, as I did, and you will understand what it means.

"Our nesting-time is during February and March. Then colonies of us paroquets, sometimes numbering a thousand, flock to a cypress swamp and build our flimsy nests in forks of trees, near the end of a slender, horizontal branch. Often there are fifty nests in one small tree, each containing from four to five pretty, greenish-white eggs. It is a good thing we build our nests in wild and unsettled places, for they are so flimsy that the eggs are plainly visible from beneath. What a temptation to the bad boy they would be, and to the bad man, also! Some paroquets, however, choose a hollow tree in which to deposit their eggs.

"Well, I have told you about all I know of myself and family, so will close by reciting in my very loudest and prettiest screech, so that all the neighborhood may hear, a few lines about a Mr. Macaw who was silly enough, after escaping from a cage, to return to it. He is a cousin of mine, a *distant* cousin, for he was born in South America; but he wears the same colored coat and vest as I do, his tongue is just as thick, and his bill curves like a parrot's, also:

MR. MACAW'S LESSON.

'Mr. Macaw was tired of his cage—
Too much of a prison for home;
Mr. Macaw was in a great rage,
And so he *settled* to roam.

The cage-door was open, the window too
(Strange chance, both open together!),
So he took his chance and away he flew;
But, alas! it was wintry weather.

Wind from the north, ground covered with rime,
A frost that made your limbs shiver;
Poor Mr. Macaw! this was not like the clime
On the banks of the Amazon River.

So Mr. Macaw grew wise, as do men,
When taught by experience bitter;
He flew back to his cage, and determined then
He would never again be a flitter.'

THE CAROLINA PAROQUET.

(*Conurus carolinensis.*)

BY LYNDS JONES.

FEW birds indeed can lay claim to such beautiful and varied dress as our native paroquet. But for this dress and for certain habits which will be spoken of more particularly a little later, he has had to pay a most severe penalty. Once an abundant bird over the whole southeastern portion of the country, ranging commonly as far north as southern Ohio and Illinois, and sometimes even as far north as southern Michigan and New York, and as far west as eastern Colorado, his numbers and range have been reduced to a few individuals in the wilds of the Indian Territory and the adjacent parts of Texas, and the fastnesses of the Florida swamps. The region over which he ranged so numerously in advance of civilization, suffers a distinct loss in his extermination.

It is hardly fair to lay the blame for the disappearance of this bird solely at the door of the plume-hunters and collectors, for it must be admitted that the paroquet was a real menace to the fruit-grower and farmer when he was abundant. Even his extreme fondness for the fruit of the cockle-bur, thistle, and a few other noxious plants, could hardly atone for the complete ruin of the apple crop, or his serious inroads upon the wheat or corn field. One could not stand tamely by while a flock of these birds, with all their beauty, stripped his orchard of every blossom and bud.

The food of the paroquet was entirely vegetable, consisting of the seed of the cockle-bur, as already stated, sycamore and cypress seed, pecan and beech nuts, the fruit of the pawpaw, mulberries, wild grapes and various other wild fruits as well as cultivated fruits, the seeds of pine cones and the burgrass. Grains of various kinds were eaten while in the milk, and Mr. Frank M. Chapman found them eating the seeds of thistles. So varied a diet enabled these birds to pass the winter in the northern parts of their range as well as farther south. It has been stated that paroquets have been found hibernating in hollow trees in the coldest winters. If they were actually found in such places they were undoubtedly simply taking refuge from some severe storm, to issue forth again when it had passed.

The paroquet's strong, hooked beak was probably so formed for the cutting of stems and husks of plants and the crushing of seeds and nuts, but he also finds it useful in climbing about trees as an aid to his yoked feet, and as a partial support while he sleeps in some hollow tree, the bill being hooked over a projection or into a convenient crevice.

Major Charles E. Bendire describes the flight as undulating, like that of the woodpeckers, but very swift, accompanied by a continuous chattering while on the wing. The birds remain together in flocks of from six to twenty individuals (before they became so scarce, by hundreds), and are very devoted to each other. The cries of a wounded companion will always recall the whole flock to his aid, thus enabling the hunter to kill every bird in the flock. It is this characteristic, no doubt, which has very largely caused the rapid disappearance of the birds before advancing civilization.

The nesting-habits of the paroquet are in some doubt, but the evidence seems to indicate that the birds may rear their brood either in a cavity in a tree or build a slight nest after the fashion of the mourning-dove. Such nests seem to be largely confined to the cypress swamps of Florida. The eggs, several of which have been secured from birds in confinement, are pure glossy white, smooth, and rather ovate in shape, somewhat larger than those of the mourning-dove, and averaging 1.39 x 1.07 of an inch.

These birds seem to nest in colonies, a fact which led Major Bendire to suggest that when the colonies were very large the birds were forced to build

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open nests from a lack of suitable nesting-places in cavities.

The cry is described as "shrill and disagreeable, a kind of grating, metallic shriek." One call resembles the shrill cry of a goose. They sometimes give utterance to low conversational notes while perched.

It seems almost incredible that scarcely more than half a century has witnessed the passing of a once abundant species of our native bird. Like the bison, the paroquet has been swept away by the rushing tide of progress, leaving only fading memories where once they were characteristic features of the landscape. We may congratulate ourselves that there are few of our birds and mammals that find it so impossible to survive the advance of civilization.

WHAT THE WOOD FIRE SAID TO A LITTLE BOY.

What said the wood in the fire
To the little boy that night,
The little boy of the golden hair,
As he rocked himself in his little arm-chair,
When the blaze was burning bright?

The wood said: "See
What they've done to me!
I stood in the forest, a beautiful tree!
And waved my branches from east to west;
And many a sweet bird built its nest
In my leaves of green,
That loved to lean
In springtime over the daisy's breast.

"From the blossomy dells,
Where the violet dwells,
The cattle came with their clanging bells,
And rested under my shadows sweet;
And the winds that went over the clover and wheat,
Told me all that they knew
Of the flowers that grew
In the beautiful meadows that dreamed at my feet!

"And the wild wind's caresses
Oft rumpled my tresses;
But, sometimes, as soft as a mother's lip presses
On the brow of the child of her bosom, it laid
Its lips on my leaves, and I was not afraid,
And I listened and heard
The small heart of each bird,
As it beat in the nests that their mothers had made.

"And in springtime sweet faces,
Of myriad graces,
Came beaming and gleaming from flowery places.
And under my grateful and joy-giving shade,
With cheeks like primroses, the little ones played;
And the sunshine in showers,
Through all the bright hours,
Bound their flowery ringlets with silvery braid.

"And the lightning
Came brightening,
From storm skies, and frightening
The wandering birds that were tossed by the breeze,
And tilted like ships on black, billowy seas;
But they flew to my breast,
And I rocked them to rest,
While the trembling vines clustered and clung to my knees.

"But how soon," said the wood,
"Fades the memory of good!
For the forester came, with his axe gleaming bright,
And I fell like a giant all shorn of his might.
Yet still there must be
Some sweet mission for me,
For have I not warmed you and cheered you to-night?"

So said the wood in the fire
To the little boy that night,
The little boy of the golden hair,
As he rocked himself in his little arm-chair,
When the blaze was burning bright.

—*Atlanta Constitution.*

THE MISSISSIPPI.

W. E. WATT.

AMERICANS like to boast of the things of this country that are larger, longer, more valuable, or more wonderful than anything of the kind in the world. They have recited in school such a number of statements about the Mississippi river that the great stream has become one of the essential points of our nation's honor.

You may be able to make the average man believe that Washington was not always as truthful in his youth as Weems in the cherry-tree story tried to make him; that Captain John Smith drew somewhat on his imagination when some sixteen years after the expedition into the woods he told the story of his rescue by Pocahontas; that perhaps, after all, we did not whip the entire British nation twice in open warfare—but it will be hard to make any native-born American admit that the Mississippi river is not the longest in the world.

He may listen to your argument in favor of the Nile or the Amazon, but he will tell you that he still thinks that if the Mississippi had been measured correctly at first, taking the source of the Missouri as the source of the Mississippi, we would have been the possessors of the longest river on earth.

And if that should seem a trifle weak he will at once tell you that the great river is more wonderful than all others because its source is several hundred feet nearer the center of the earth than its mouth. In other words, the river flows up hill. The curvature of the earth is not the true arc of a circle from the equator to the poles, for the axis of the earth is shorter than its diameter at the equator by about twenty-six miles. It is thirteen miles less from the north pole to the center of the earth than from any point on the equator to the center. So the river flows towards the equator with an apparent fall as estimated from the sea-level, but with an actual rising away from the earth's center just as the sea rises round this shoulder of the earth.

So the Mississippi is a source of joy and boastful conversation to every citizen of the United States.

The Acadian settlers of Nova Scotia whose praises have been sung by Longfellow in his "Evangeline", were the earliest to reclaim land from the sea in America. Being weaker than those who used the ax to fell the giants of the forest primeval, they were more skillful with the spade. They took advantage of the extremely high tides of the Bay of Fundy and its branches, and when the water was low threw up embankments which prevented the sea from covering part of the rich red mud flats before the village of Grand Pre.

At the time of their painful dispersion they had secured all the land between the original shore and the island which stood out in the basin of Minas.

Though they could not take these rich lands with them in their exile, many of them carried the knowledge of dike-building down to the lower courses of the Mississippi, and taught the rest of the Americans there how to get the fat lands of the river bottoms by means of levees.

When General Pakenham gave up his life and lost a fine British army to General Jackson after the treaty of peace had been signed in the War of 1812, his right rested on the bank of the Mississippi where there was a levee a little over five feet high.

This levee cut off the waters from spreading when the freshet was on. It was sufficient at that time. Extensions of levee work cut off more and more of the bottom-lands from the spread of the high waters till now nearly four-fifths of the area over which the waters of the June freshet used to spread are protected by these structures.

The levees are not now the low banks of earth which once kept the waters back. The great mass of water that comes from the melting of snows in the Alleghenies and the Rockies must either spread out or pile up. Confining within less than a mile of width a surplus of water that formerly spread itself for a hundred miles makes it nec-

essary for the water to rise and rush forward with greater violence.

Year by year the levees have crept up the sides of the great river, choking it into narrow walls. Year after year it has risen in its wrath and burst its bounds to destroy the cities and plantations which have been fattening in the mud of its alluvial flats. Every year the levees are put up higher, and as the works extend to the northward and more effectually close up the southern places of spreading out there is an average increase in the stage of high water and in velocity of the current. When it was allowed to wander over great stretches of country the water seemed in no hurry to get to the gulf, but now it goes tearing madly through its narrowed banks, and it has become a question with Congress which will take much deliberation and experiment as well as great financial outlay to solve.

It has been proposed that great reservoirs be constructed in the mountain districts to hold back the waters that are wasted in their rush to the sea. If there could be made in the Bad Lands in northern Wyoming a reservoir that would hold all the waters accumulating there during the months of spring, that reservoir would "skim off" the top of the Mississippi river two thousand miles away and save the people there from the perils that threaten them whenever the water mounts toward the danger-point.

It would require a vast artificial lake to hold these waters, but there are mountain ranges that could be utilized to form the barriers and the land taken from profitable grazing could be paid for with much less expense than the cost of one inundation of Mississippi bottom lands when a levee breaks.

Instead of one vast reservoir it will probably be found expedient to lay out a great number of works for retaining the western waters, as well as others in the eastern mountains and some in the beds of other tributary rivers whose sources are in the great basin between.

If these stores of water could be utilized for irrigation it is probable that the works would eventually pay for themselves in the increase in value of cultivated lands. The water at present is largely wasted because it rushes past the lands that need it before their distress of drouth comes, and its bulk is fairly spent when they need most the water that has passed. Adequate systems of reservoirs would also prevent largely the wearing away of banks and the changing of the course of the channel and even of the river itself which now sometimes tears away the foundations of cities, obliterates landmarks, and carries off bodily many well-tilled farms. Navigation could be much improved if the stages of high water could be moderated.

The Kansas farmer complained that the Missouri river is too thick to drink and too thin to plow. Control of surplus water near the sources would make this river so moderate that commerce would move along its surface. Varying moods and shifting sands now prevent navigation on that great river almost completely.

The Chinese have a problem similar to ours. Their government esteems their board of public works as one of the highest in their country. This board has charge of the canals and embankments along the great rivers. But it is a Chinese board.

The Hoang Ho resembles our great water course in that it rises in mountains and flows for hundreds of miles through comparatively level country in its lower courses. It deposits mud along its way through the great plain so that the people are continually obliged to construct levees higher and higher until nature no longer will put up with such treatment and the great yellow river breaks its bonds and travels across the country to find a new outlet at the seacoast.

In 2500 years it has altered its general course nine times with terrible destruction of life and property. Its last great breach occurred in 1887, when it tore through the empire a new channel that caused its waters to reach the sea through the mouth of the Yangtsekiang five hundred miles away from its present mouth. More than a million lives were lost and the devastation of the country has never been approximately estimated. The gap torn in

its embankment was two-thirds of a mile in width. Efforts to close it were ineffective except in low water, and when it was at last almost accomplished the celestials had a narrow but constantly deepening breach to mend, its depth during the last days of the work being so great that a torrent sixty feet deep fought with gigantic might against the endeavors of the men. At times the bed of this river has actually stood above the level of the surrounding country, its walls having risen with the rise of the bed due to the deposit of mud till it seemed as if the great river had risen to take a look over the surrounding plain to see where it could wreak the direst vengeance on those who prevented it from running unvexed to the sea.

We may learn from the wide experience of the Chinese that there is no safety for us in merely building higher the walls to restrain the Mississippi. The nation must take hold of the matter with a strong hand. Possibly forty or fifty millions will be necessary to construct the works which will moderate the flow and distribute its waters to those who need it in their irrigating ditches. Even though it cost thrice the sum paid to Spain in settlement of the Philippine question, the people would more gladly give it.

Nothing short of a great ship canal along the bed of the Mississippi will satisfy Americans. There is but one objection to the work, and that is its great expense. But we have recently seen that the cost of one great inundation along the Brazos was far more than the figures here named, and no account need be made of the loss of life and the suffering that followed that great disaster.

Our great river must be controlled. Not in the Chinese fashion, which we know to be merely the storing of wrath against the day of wrath, but it must be done intelligently and with patience, with faith in ourselves and a determination to prevent the great loss of life which will be imminent every time there happens to be the coming of a flood from the eastern mountains and another from the western at the same time.

Our great water way, when properly controlled and protected by permanent revetments and masonry, will furnish the farmers of the great plains a natural outlet to the sea for all their produce. This will be monopolized by no railway trust; no combination of steamboat men will put the farmer into the hands of corporations seeking to rob him of the best part of his crop on the way to market, for there will be docks along every man's water front, and the rudest flatboat will always rely upon the favoring current to bear its cargo to the sides of independent vessels plying the seas to the uttermost parts of the earth.

INDIAN SUMMER.

Withal there comes a time when summers wane,
When from the sunshine something seems withdrawn,
And pensive shadows lengthen on the lawn;
White bindweed wanders lonely in the lane,
The one sweet thing that now unwithered doth remain.

But there is beauty in autumnal bough
No less than in dear April's dewy leaves,
When with its store of golden-girdled sheaves
Piled stands the wain where one time passed the plow,
And ripened labor reaps fulfillment of its vow.

Then, though no more the oblivious cuckoo calls
From land to land, nor longer on the spray
Of yellowing elm the throstle vaunts his lay,
The ringdove's mate, as fades the leaf and falls,
Reiterates its note of love that never palls.

Though fluttereth still the soul-like lark aloft,
There is a quiet in the woodland ways,
The retrospective hush of vanished days,
And around garden close and orchard croft
A something in the air celestially soft.

From hamlet roofs blue spires of smoke once more,
As dies the day in mist along the dale,
And widowed evening weeps behind her veil,
From log-replenished ingle heavenward soar,
And lamps are early lit, and early latched the door.

—*Alfred Austin.*

THE CHIPMUNK.

(*Tamias lysteri.*)

C. C. M.

NATURALISTS, as well as many ordinary observers, it is said, recognize numerous varieties among the chipmunks of the United States, founded principally on the markings of the fur; for in their habits they are all very similar. Elliott Coues describes four varieties found in this country.

The American chipmunk, hackee, or chipping squirrel (*Tamias lysteri*) is distributed all over the United States. The face is of a reddish brown tint, with darker spots on the forehead and cheeks; the nape of the neck is ashen gray, the hind-quarters reddish brown, the under surface whitish; there is a dark-brown stripe on the back, a black stripe over the eye, with white above and below it, and there is a wide white side-streak edged with blackish brown; the upper surface of the tail is dark-brown, the base being grayish yellow, the tip whitish and the lower surface a ruddy hue.

This description may seem superfluous, in view of our picture of the lively little animal; we think, however, it may induce closer observation of the markings of its fur.

The chipmunk is visible at all seasons of the year, but late in summer it may be seen running about, "its cheek pouches filled and its eyes beaming with the satisfaction which its riches afford it." According to the different months in which they mature, it gathers its varied stores, for the most part consisting of buckwheat, hazelnuts maple seeds, and corn. During the winter it hibernates to some extent, but it seems to stand in need of food during the whole winter. Audubon dug up a burrow in January, and at the depth of about four feet he found a large nest of leaves and grass in which were three chipmunks; others seemed to have disappeared in the lateral passages at the approach of the diggers. The animals were overcome with sleep and not very active, but they were not as torpid as true hibernating animals are, and they snapped viciously at the naturalist, who tried to handle them. The animal does not become torpid before November. It does not leave its subterranean home during the winter, but keeps a passage open. When the snow melts it begins its activity above ground.

The young are born in May, and a second litter usually in August. It is said the males engage in fierce combats during the breeding-season.

The farmer is not very friendly to this animal, which he regards as a pest. It is hunted extensively. A whole army of enemies is constantly engaged in its pursuit. "Boys utilize it to practice the noble sport of hunting; weasels pursue it both on and under the ground; cats deem it a prey equally as good as rats and mice, and all larger birds of prey carry it off whenever they have a chance. One of these birds has even gained for itself the name of squirrel-hawk, because of its attacks on the chipmunk." The rattlesnake, according to the observations of Geyer, also follows the poor little creature with a great deal of perseverance. Winter often causes sad havoc among the numerous young brood born in summer. Yet they are very plentiful, at least in favorable years, the great fecundity of the female making up for the losses. Their chief protection against enemies is the difficulty in finding them and the amazing nimbleness they display as they dart between and under hedges like wrens.

The beauty and gracefulness of the ground-squirrels render them interesting pets, but as they never become quite tame, are timid and addicted to biting, and gnaw everything in the cage they are not very desirable to keep. Their care presents no difficulties, and they thrive well on the simplest diet of grain and fruit.

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Greenwood Cemetery, Brooklyn, N. Y., is suffering for the second time in its history from a too great increase in

its colony of chipmunks. Eighteen years ago they became such a nuisance that a trapper was employed, and 28,000 small striped pelts were the results of his first year's work.

This year it was noticed that an unusual number were about, even in the early spring, when the chipmunks first appear after a winter's sleep. Now it is estimated that there are at least 20,000 chipmunks in the cemetery, and a great deal of damage has been done. Through their burrowing habits they have undermined the gravestones, and even in many cases caused graves to sink in, when rainwater has helped to hollow out their burrows.

The chief enemies of the chipmunks are the florists, for the animals nip growing plants at the roots to reach the sap. One Brooklyn florist says that since Decoration Day he has had to put in 250 new plants to keep up an original plat of 150. Florists with contracts to keep graves in condition have entered strong protests, but outside florists, who work by the piece, have been making money.

The eight special policemen on the grounds have been furnished with poisoned nuts to scatter about. No diminution has yet appeared in the chipmunk army, as they reproduce three or four times a year and increase fourfold in a season if not checked. But if poison fails another trapper may be called in.

Our Animal Friends says that some children were feeding chickens with some stale bread one day, and two or three chipmunks appeared. They wanted the bread, too, and every time the children threw a bit down, both chickens and chipmunks would make a rush for it; and nearly always the chipmunks got it. One of them was particularly smart; he gathered all his pieces in a little pile between two stones, and he seemed to keep one eye on them and the other on the lookout for fresh pieces all the time. At last one of the chickens saw the pile and made a run for it, but its owner got there first, and he just sat right down on the top of the heap and *chattered.* The chicken kept on coming nearer and looking rather as if he would fight for it, so Mr. Chipmunk sat straight up, twirled his tail, and just seemed to shake with anger. Then another came along to help him, and the two tucked all the pieces into their pockets and off they darted, leaving the poor chicken looking awfully disappointed.

TED'S WEATHER PROPHET.

GRANVILLE OSBORNE.

Flittin' along from tree to tree,
Chipper 'n friendly ez he kin be;
Dancin' erbout on the'r talles' lim',
Jes' the likeliest place fer him.
Bound ter foller 'n seems to know
Very bes' places I like to go;
Bobbin' his head 'n winkin' his eye,
'S if he knew all erbout ther sky;
'Nen he nods an' sez as plain,
"Goin' ter rain; goin' ter rain!"

Little feller 'ith coat all brown,
Vest uv red wher' the wings come down,
Primpin' his feathers 'n winkin' at me,
Mincin' er-round so he kin see;
'Taint no use ter hide erway,
'At's a game what two can play;
'Course he finds me, 'nen he tries
Ter make believe he's awful wise.
All uv a suddin he sez again,
"Goin' ter rain, goin' ter rain!"

Climbed way up ter his nest one day,
"Better be careful," I heard him say;
Ruffled his coat 'n looked so mad,
I didn't 'spose he could be so bad.
Coziest nest 'at ever you seen,
Snuggled way up amongst ther green;
Four little eggs, ther purtiest blue,
Didn't touch one uv 'em, honest 'n true!
Robin hops on 'n begins ter explain,
"Goin' ter rain, goin' ter rain!"

THREATENED EXTERMINATION OF THE FUR SEAL.

THE fur-seal herds of the north Pacific breed on islands situated in Bering Sea and belonging to the United States and Russia. On these islands, Pribilof and Komandorski, for nearly a hundred years they have received all necessary protection from attacks on land. The existence of the herds, however, demands the further protection of the females when they are feeding or migrating in the open sea beyond the usual three-mile limit of territorial jurisdiction. The animals visit certain islands in the summer. They breed on them and make them their home. The young remain there until driven away by the storms of winter. The adults leave the islands in summer only to feed, going to a distance of one hundred to two hundred miles for that purpose. The winter is spent by the entire herd in the open sea, their migrations extending from one thousand to twenty-five hundred miles to the southward of their breeding-resorts.

For many years, both under Russian and American control, the herds have, as I have said, received absolute protection on land, the killing for skins being restricted to the bands of superfluous males. As only one male in about thirty is able to maintain himself on a rookery or to rear a family, about twenty-nine out of every thirty are necessarily superfluous. The survival of one male in a hundred is sufficient for all actual needs of propagation. The young males on land are as easily handled and selected as sheep, and no diminution whatever to the increase of the herd has arisen from selective land-killing. The number of females in the herd bearing young each year was, in the earlier days, about 650,000 on the American islands and perhaps half as many on the Russian. The numbers of males and of young were together about twice as many more. This gave an annual total on the American, or Pribilof, islands of about 2,000,000 animals of all classes, while on the Russian, or Komandorski, islands there were about 1,000,000.

About 1884 different persons, known as pelagic sealers—chiefly citizens of Canada, but some of them from the United States—began to attack the herd in Bering Sea. Here no selective killing was possible. The females were always in the numerical majority, as the males had become less numerous on account of land-killing and as they left the islands less frequently in the summer. Each female above two years, when taken in the sea, died with her unborn young. Most of the adult females so taken after July 1 had left their young on the islands, and these orphan pups invariably starved to death.

Beginning with this increase of pelagic sealing in 1884 the fur-seal herds rapidly declined in numbers. In 1897 there were about 130,000 breeding-seals on the American islands, or about 400,000 animals of all classes, while on the Russian islands there were less than 65,000 breeding-animals, or less than 200,000 of all classes.

For this great reduction in numbers there is but one cause—a cause plain, self-evident, and undeniable—and that is the slaughter of breeding-females at a rate largely in excess of the rate of increase. While other causes have been assigned, none of them is worthy of the slightest consideration in explaining the decline.

Even in 1893 it was evident, to all capable of forming an opinion, that pelagic sealing was the sole known cause of the decline of the fur-seal herds. It was also evident that as an industry it must be self-destructive, since, if permitted to exist on any scale which would make it profitable, it must destroy the herd on which it operated.—"*Lessons of the Paris Tribunal of Arbitration,*" *by President David Starr Jordan, in Forum.*

THE PEACH.

WILLIAM KERR HIGLEY,
Secretary of The Chicago Academy of Sciences.

THE peach (*Amygdalus persica, L.*), is one of our most important and best-known fruits.

It is not found in the wild state, in its present form, though in some localities it propagates itself, having escaped from cultivation.

It is probably a native of China, where it has been cultivated for centuries and where it is said to reach its greatest perfection, although Darwin holds that the evidence seems to indicate that the wild almond of Persia is the original source of the cultivated almond, the peach, and the nectarine. The specific name *persica*, has its origin in the fact that the peach was obtained from Persia, both by the Romans and the Greeks.

Dr. Willis tells us that "it was introduced into Italy from Persia by the Romans, in the reign of Claudius Cæsar. It was introduced into Great Britain during the sixteenth century, and thence brought in 1680 by the settlers of Virginia to America."

The number of varieties seems to be unlimited. Over four hundred have been catalogued, though less than one hundred of these are constant. The nectarine is considered a variety and closely related to the peach and the plum, the apricot, and the cherry.

The tree itself, when bearing its beautiful rose-colored, five-petaled flowers, is highly ornamental. It seldom grows higher than twenty feet and its branches form a symmetrical top. One very ornamental variety produces double flowers and bright, shining leaves, but no fruit.

This valuable plant is generally placed in the family *Rosaceæ*, which includes many species of economic and ornamental importance. Besides those already mentioned, here belong the rose, the strawberry, the raspberry, the blackberry, the apple, the pear, and the quince, as well as many beautiful wild forms.

The thousand or more species usually classed in this family may be readily separated into distinct groups, to which are given distinct family names by some authorities. Thus, the peach, the cherry, the plum, and the almond, which resemble each other in regard to the structure of their fruits and in their chemical constituents, may be placed in a family by themselves.

It is of interest to note that this luscious fruit was not always considered free from noxious qualities. Pliny states that it was considered by some that its presence in Egypt was due to its introduction there by the Persian king for the purpose of poisoning his enemies.

The Chinese writings refer to the peach as early as the fifth century before Christ, and it is given the name "tao" by Confucius. We are also told that in these writings "the peach tree holds the same place that the tree of knowledge does in the sacred scriptures, and that the golden Hesperides, apples of the heathen, hold among the western nations."

In Chinese mythology a peach tree is mentioned which was thought to possess the power of causing immortality but which produced its fruit but once in a thousand years, and another, which grew on a mountain and which existed in the early history of China, was said to be guarded by a number of demons.

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PEACH.
½ Life-size.

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THE TRANSFORMATION OF THE VICEROY.

(*Basilarchia archippus.*)

REST METCALF.

UGH! The ugly worm! Crush it! Wait a moment, listen, while I tell you a more excellent way. Notice on what your worm is feeding; take a branch of it home and place it in a bottle of water with the worm on it; then place the bottle with its contents in a large box, fastening a wire securely over the box, to prevent the escape; then watch your worm. Perhaps your worm will be the one so often found on the milkweed (*asclepras*) with black and yellow stripes around his body, two little horns in front on his head and one at the tail. If you keep him well supplied with fresh leaves, in a short time he will eat all he wishes and then, and not until then, will he leave the plant on which he is feeding and travel many a long journey up and down and all around the box, until you may imagine he has gone crazy from his confinement; but that is not the case, as you will soon see. When he finds just the right place, he will remain quite still to all appearances, but really he is very busy with his bobbin of silk and glue bottle weaving a small silken mat and fastening it very securely to the top of the box, and the next thing you will see him hanging by his tail from this mat, with his head recurved. Watch him and you will notice that he makes little jerky motions. For about twenty-four hours he remains in that same po sition, when suddenly he drops down his head so that he hangs straight down; now don't leave him for a moment, for very soon after taking that position, his black and yellow striped coat begins to split open, right between those two little black horns on the head, as evenly as though cut with a sharp knife and a pale green globular object comes into sight. With a few contortions of the body the little fellow pushes up his old coat, folding each stripe, just as Japanese lanterns fold up, then with a dexterous movement he fastens the end of his beautiful green chrysalis to the mat, dropping his old clothes, so closely compacted together that you would hardly recognize them. Now for two hours he exercises by little shrugs until the beautiful green chrysalis hangs complete, with gold band and pure gold spots, the most beautiful chrysalis I ever saw. Everyone exclaims, "How beautiful!" and wonders how an ugly worm could so transform itself into a thing of beauty.

For ten days we can see no change in the looks of this chrysalis; then it grows darker and darker until you can distinguish the veins on the wings of the future butterfly. Then this little fellow, tired of his close quarters, opens the door of his beautiful chrysalis and creeps out, clinging fast to the empty nest. O, what tiny wings! But as you watch they dry out and lengthen to three times their first size and you behold the beautiful large Viceroy—orange-red wings with black lines along the nervures and a row of white spots along the outer margin, his black body beautifully spotted with white.

Or perhaps you may find, on the carrots in your garden, a worm with black and green stripes around his body, the black stripe being decorated with yellow spots. He will spin a long silken mat the length of his body and to that mat fasten a swing to hang around his body, so that by using a little glue at the end of his body the swing will hold his chrysalis in place. This chrysalis is not as beautiful as the Viceroy, but very interesting in its odd shape and in its development and will well repay all the interest taken in it. Perhaps you may be surprised by not seeing a beautiful butterfly emerge from your chrysalis, but instead an Ichneumon fly, for often the Ichneumon fly deposits her egg in the caterpillar's back, and he can not say her nay; after he is nicely settled in his chrysalis this egg hatches and develops rapidly, needing so much food that nothing is left of the poor caterpillar or worm, but the fly prospers and soon comes forth full-grown, from

a round hole which he makes in the side of the chrysalis.

Each variety of worm and caterpillar will reward you with a different chrysalis or cocoon. If you are not sure of your worm place a box of dirt in your box, for some worms go into the dirt to make the great change. After watching these changes you, too, will say: "Don't crush the worms! For are they not a symbol of our own death and resurrection when we shall awake in His glorious likeness?"

BIRD LORE OF THE ANCIENT FINNS.

IN the *Bulletin of the Michigan Ornithological Club* H. S. Warren says that nature and nature-worship form the center of all the life of the ancient Finns, and he quotes freely from Crawford's translation of "The Kalevala," the national epic of Finland. He says that, "as the English language is not strong in diminutives, and therefore lacks some of the most effective means for the expression of affectionate, tender, and familiar relations, in this respect all translations from the Finnish into English must fall short of the original, the former being the language of a people who live pre-eminently close to nature, and are at home among the animals of the wilderness, beasts and birds, winds and woods and waters, falling snows and flying sands." The metre is like that of "Hiawatha," and is the characteristic verse of the Finns.

As to birds, the duck lays the mundane egg. "Then the water-mother finds a place upon her own knees for the duck to rest, where it lays an egg which rolls into the sea. There it breaks and is transformed into the earth."

From one half the egg, the lower,
Grows the nether vault of Terra;
From the upper half remaining
Grows the upper vault of heaven;
From the white part come the moonbeams,
From the yellow part the sunshine.
* * * * * *
Wainamoinen, wise and ancient,
Made himself an ax for chopping,
Then began to clear the forest,
Then began the trees to level,
Felled the trees of all descriptions,
Only left the birch tree standing
For the birds a place of resting,
Where might sing the sweet-voiced cuckoo,
Sacred bird in sacred branches.
Down from heaven came the eagle,
Through the air he came a-flying,
That he might this thing consider—
And he spake the words that follow:

The eagle inquires of the ancient singer, Wainamoinen, why he has left the birch tree only standing; and upon being assured it was left solely for the use of the birds, he commends Wainamoinen's "hero-judgment." There is a lesson in forestry for the modern day.

Wainamoinen, old and trusty,
Turned his face and looked about him;
Lo! there comes a spring-time cuckoo,
Spying out the slender birch tree—
Rests upon it, sweetly singing:
"Wherefore is the slender birch tree
Left unharmed of all the forest?"
Spake the ancient Wainamoinen:
"Therefore I have left the birch tree,
Left the birch tree only growing,
Home for thee for joyous singing;
Call thou here, O sweet-voiced cuckoo,
Sing thou here from throat of velvet,
Sing thou here with voice of silver,
Sing the cuckoo's golden flute-notes;
Call at morning, call at evening,
Call within the hour of noontide,
For the better growth of forests,
For the ripening of the barley,
For the richness of the Northland,
For the joy of Kalevala."

Thus is the cuckoo looked upon as a prophetic bird, or perhaps a mediator between the man and his gods.

The woodpecker is another sacred bird of "The Kalevala." In that epic he is not directly named, perhaps, because he was so very sacred, but the minor wood god, Nyyrikki, upon whom Lemminkainen calls in his distress to help him track the elk, is, like his father, Tapio, evidently a survival of Pikker, the woodpecker.

O Nyyrikki, mountain hero,
Son of Tapio of forests,
Hero with the scarlet headgear,
Notches make along the pathway,
Landmarks upward on the mountain,
That the hunter may not wander.

BIRD NOTES.

F. SCHUYLER MATHEWS says, in an article in *Popular Science*, that the bird not only possesses an ear for music but the mind to produce it. As our own conventional conception of music does not at all correspond with the wild bird's song, we are apt to consider the latter as foreign to art. If, however, we choose to consider the bird's conception of music a lawless one, we must show that he ignores all fundamental principles. This it is impossible to do, for he invariably resolves his effort to a perfectly intelligible, logical, musical idea. His music is, therefore, an art at least in part.

"There are," Mr. Mathews continues, "three woodland singers who will perfectly illustrate my idea of the underlying principle of bird-music. These are the chickadee, the white-throated sparrow, and the hermit-thrush. The chickadee sings, or I may say, calls his mate, with a perfect musical third, or with two notes separated by a complete musical interval. One bird may sing the third; another may answer in two descending notes. The remarkable thing about this simple example of melody is that the intervals between the notes are correctly measured. The result of his effort is a combination of tones in perfect accord with a law of music, and we are bound to accept it as an example of melody.

"The chickadee, too, it should be remembered, is not a high type of bird; there are many steps of progression between him and his more gifted cousins, the thrushes, who are, indeed, musicians of a high order. But, just here I might as well call attention to the fact that bird-music should not be overestimated. Its character is fragmentary, and its unconventionality is obvious. The wild songs of the woods and fields are not musical compositions; they are at best but detached bits of melody imperfectly conceived, although often replete with the suggestions of a complete musical idea.

"For instance, the white-throated sparrow or Peabody bird sings a perfect musical phrase which we may harmonize as we please, because it certainly suggests harmony. This is absolutely no more than the bird sings. The musical intervals, the pitch, and the lengths of the notes are all correctly sustained. In other words the bird suggests a complete musical idea. But the little Peabody bird seldom attempts a more difficult or elaborate task. He knows his limitations, and keeping within these, his attempts are musically both consistent and perfect. But let us turn our attention to the more gifted songster of the northern woods, the hermit thrush. His capacity for simple melody, his technical mastery of tone intervals and note values, his phrasing and his brilliancy as a performer, are certainly not exceeded by any vocalist of nature.

"But we must again studiously heed the limitations of the bird's idea of music. We are still in the presence of the untamed singer, who is amenable only to his own elastic laws. The hermit thrush starts his song with a prolonged keynote (often it is A) and then springs upwards in thirds and fifths with such rapidity and ease that we are amazed at the accuracy of the performance. Not only are the tones correctly given, but they are embellished with subsidiary or tributary tones.

"The last note, C, too faint to be heard at any distance, is rendered in a gyrating, suppressed way, impossible to describe, but comparable to the soft tones of a harmonicon. This note is an excellent example of bird lawlessness regarding music. It is quite antipodal in character to the initial note (A) with which the bird slowly begins, as if desirous to found upon it a solid musical phrase; but he fails most utterly at the last and subsides into an exquisite, elusive, compound tone—I do not know what else to call it—which he rounds off in a plaintive pianissimo. He is not satisfied; he begins the same strain

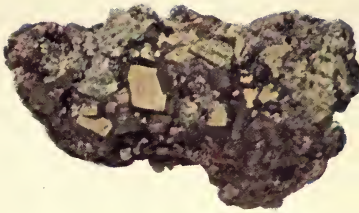
again, now in another key, and with no better success in the final than in his first effort. So he starts again with a variation, this time striking an initial note higher than before. Then he makes another attempt; but still he seems dissatisfied and, after a short rest, three tiny high notes come from his throat, full of perfect melody, as simple as that of the chickadee."

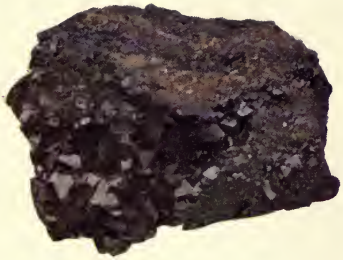
The bird is a transcendentalist, ever attempting what he cannot satisfactorily accomplish, but failing, only to delight us with the strange sweetness of the imperfect performance. The highest form of bird-music is unquestionably revealed in the songs of the thrushes. Here we have not only a simple fundamental rule, amply demonstrated, but also a partially developed series of musical ideas, strung together with a well-chosen relationship. Of course, musically considered, the development of the melody and the connection of the phrases are more or less imperfect; but that does not matter. The truth is, the bird is an accomplished singer who cares less for conventional rules than he does for the essence, or the soul of the music; but above all he succeeds in inspiring his listener. What more, may I ask, could be expected of a musician?—*School Journal.*

STORY OF A NEST.

ANNA R. HENDERSON.

Far away in the beautiful land of Brazil,
Where the birds are all singing o'er valley and hill,
Two little children walked out 'neath the trees,
Talking in musical Portuguese;
And if you will listen to what I say,
I'll tell you in English their words that day.
"Sister," said Manuel, "often I've heard,
That the trees scarce have room for the nest of each bird;
For this is the land of these beautiful things,
And the air seems alive with their songs and their wings;
And I think that I know of a little bird breast,
Which was puzzled and troubled for place for a nest."
"Now, brother," said Lena, "don't tell me a word,
Let me hunt for the nest of this crowded-out bird,"
So away they went roving o'er hill and through dell;—
Of the nests that they found 'twould take hours to tell.
There were nests in the orange trees, blossoming white,
There were nests in the coffee trees, glossy and bright,
There were nests in the hedges, the bushes and grass,
In the dark, hanging vines, by each roadside and pass.
There were blue eggs and speckled eggs, brown eggs and white,
And yellow throats opening with chirpings of fright.
"Search no longer," said Manuel, " 'mid bushes and trees,
'Tis a stranger place, sister, than any of these."
"I give up," said Lena, a shade on her brow,
"Come, hasten, dear Manuel, I'll follow you now."
Then away to the garden the little feet sped,
And he showed her the nest in a big cabbage head!





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IRON ORES

Magnetite.

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Pyrites
Limonite

Pyrites
Limonite

COMMON MINERALS AND VALUABLE ORES.

THEO. F. BROOKINS.

I.—IRON MINERALS.

PROBABLY many a bright youth, accustomed to wander through the fields in enjoyment of nature, has been thrilled with pleasurable anticipations on finding, in some outcrop of crystalline rock, a mineral substance that glittered as gold. That his anticipations were premature should not deter the ambitious youth. Men far beyond him in experience have been deceived by that same "fool's gold." History records that shiploads of the valueless yellow iron pyrites were sent to England by explorers of America on the supposition that they were accumulating gold.

Of the various compounds of iron occurring in nature, but four may be considered as relatively common—pyrite, magnetite, hematite, and limonite. Pyrite consists of iron and sulphur; magnetite, hematite, and limonite are oxides of iron. The first-named mineral differs largely from the others in external appearance as well as in composition. The others are, however, readily differentiated. We will discuss each of the four minerals in the order mentioned above.

The sulphide of iron, pyrite, occurs in many crystalline rocks; but, owing to the difficulty of separating the iron and sulphur, is not used as an ore of iron. The mineral much resembles in external appearance a yellow ore of copper, called chalcopyrite, from which it may be distinguished in that it will strike fire with steel. A specimen of pyrites containing large crystals is an interesting subject of study. These crystals are cubical in shape, but generally massed together so that no single crystal form may be observed as complete. Peculiar striations on the cube faces may often be noted. The striations of no two adjoining faces are continuous; but rather a striation of one face bears to that of another in direction the relation of the stem of a printed T to the top, or vice versa. Owing to the affinity of each component element for oxygen, pyrite often changes to vitriol, or else forms the oxide of iron, limonite, described below.

The black oxide of iron, magnetite, occurs widely distributed. As its name indicates, it sometimes displays the properties of a magnet. If a fragment of unequal dimensions be suspended freely by a string, the longer dimension will gradually swing into a north and south direction. The property possessed by magnetite of attracting other bits of iron appears to have been known to the ancients, and by them the name lodestone was applied to the mineral. Since the power to attract other particles of iron is not apparent in all specimens of magnetite we must consider other more distinguishing characteristics. The ore is very heavy; particles of it are attracted by an artificial magnet, in which regard it differs from the other minerals we have mentioned; if a piece of the ore be scratched across the surface of a harder substance, *e. g.*, smoky quartz, a black "streak" will be left. Pure magnetic iron ore is intensely black, with no coloring.

In a series of ore beds formerly operated by a mining company of northern New York, four distinctions

of the crude ore were made, two varieties of blue, one of black, and one of gray. The blue coloring is apparently due to the presence of impurities; the black ore is evidently magnetite; and the steel-gray mineral, failing in the characteristic properties of magnetite, finds its class place under hematite. Hematite differs from magnetite in representing a higher degree of oxidation. It is often found, as indicated above, in beds distributed in close conjunction with those of magnetite. This ore is a valuable source of iron. Hematite commonly occurs in earthy materials, as red ochre. Its streak is red. All rocks of a reddish or red color owe the color to this oxide of iron.

When hematite rusts, the brownish-yellow or yellow iron oxide, limonite, results. The streak of limonite is yellow, thus distinguishing it from hematite. Disseminated through beds of clay, limonite gives them the characteristic yellow color. Such clays turn red when heated, since the water of the limonite is driven off, leaving hematite as a residue. This is the explanation of the usual coloring of bricks. Yellow ochre is impure, or earthy, limonite.

WHEN ANIMALS ARE SEASICK.

PHEBE WESTCOTT HUMPHREYS.

ANYONE who has traveled extensively has had an opportunity in some of the ocean voyages to witness the seasickness of animals, and many queer stories are told from time to time of their actions at such times—how lions become unkinglike, monkeys ape humanity, and dogs are especially woeful—and one realizes that human beings are not the only ones that suffer from seasickness, by any means.

One hears a good deal about pangs that have filled the men and women with woe, but little is said of the menageries brought to America every year, or carried hither and yon in wave-tossed boats.

Lions and tigers may be majestic when they have unwavering earth or rock against their paws, but a seasick cat of these tribes is as forlorn as any man ever was, and doesn't look a bit more kingly than a wet rabbit. Even its roars and growls have a weeping sound in them, quite in keeping with the general appearance of the beast.

A monkey is as pitiable an object when it is seasick as any other beast so stricken, and its forlorn facial expression is so humanlike and the way it clasps its paws across its stomach is so natural that the man who is not seasick necessarily sees something to laugh at in the misery of the creature. Not so with the seasick man. If he sees a seasick monkey he is sure to get very angry, thinking the poor thing is mocking him.

It takes a dog to be woeful at sea. It has a way of doubling all up, with its tail between its legs and its head hanging down that shows a deep-seated pain. To free itself the dog goes through all sorts of contortions. It will stretch out on the deck, groan and whine, sometimes rising on its haunches and lifting its head and howling long and miserably, as some dogs do at the sound of music.

Many other animals show signs of great distress when on the water in rough weather, and any animal that is thoroughly seasick will show almost human signs of distress and appeal for sympathy, yet one can scarcely help laughing at their actions, even in the face of their evident suffering.

THE TRAMPS OF BIRDLAND.

ELANORA KINSLEY MARBLE.

THE birds had met in council that morning, and from the great chattering and chirping I judged some very serious question was up before the board.

"Something must be done," Mr. Red-eyed Vireo was saying, as I sauntered down to the orchard and seated myself beneath an apple tree, "we have stood the imposition long enough. Every year we meet and draw up resolutions, with many 'whereases' and 'wherefores,' and 'aforesaids'—resolutions with nothing resolute about them. To-day, I say, something must be done."

Mr. Wood-thrush, Mr. Towhee, Mr. Chipping Sparrow, Mr. Yellow-breasted Chat, Mr. Song Sparrow, and several Mr. Flycatchers, beside a number of other small birds, nodded their heads in unequivocal assent.

"We have enemies enough," continued Mr. Vireo, "how many only Mother Nature knows. Even in the darkness of night we are not safe from the owls, skunks, snakes, and other robbers, and in the day-time, besides our feathered foes, we have the ruthless 'collector,' and the ever-present bad boy. Enemies without are bad enough, but to have in our very midst a—a—" Mr. Vireo paused, presumably choking with indignation, but really because he had quite forgotten what he had prepared to say.

"Hear, hear!" cried the assembled birds, making a great clamor and clatter in order that the speaker might have a chance to slyly consult his notes.

"A tribe of social outcasts—tramps, in fact," continued Mr. Vireo, "whose females, disliking the cares of family life, build no homes of their own, but instead deposit their eggs in some other bird's nest that their young may be hatched and reared without any trouble to themselves. Our mates have enough to do to bring up their own families, so I say the tribe of cowbirds must be driven from this community, or else, like the rest of us, be forced to work."

"H'm! yes," sighed Mr. Towhee, "that's what we say every year, and every year the conditions remain just the same. The cowbirds are tramps by nature, and you can't change their natures, you know."

I judged, from the great chattering and chirping, that grave exceptions were taken to this remark, but quiet at length being restored, Mr. Towhee continued:

"My mate says it depends upon ourselves whether the whole tribe shall be exterminated. She, for one, does not intend to hatch out any more of Mrs. Cowbird's babies. This spring we found one of her speckled eggs in our nest, but it wasn't hatched out, I warrant you. We simply pierced the shell with our bills, picked it up by the opening, and carried it out of the nest."

A round of applause greeted these remarks, much to Mr. Towhee's gratification.

"It strikes me," said Mr. Indigo Bunting, "that the whole fault lies with our mates. From the size and different markings of Mrs. Cowbird's eggs they can always be distinguished from their own. No self-respecting bird should ever brood one; in that way we can exterminate the race."

"'Tis the mother-instinct, I presume," said Mr. Vireo, "or the kindly nature of some females, not to neglect a forlorn little egg abandoned by its parents at their very door. Ah," he broke off, pointing in a certain direction, "is not that a sad sight for an affectionate husband to see?"

On a fence near by stood two birds—a very small one, with a worried, harassed air, endeavoring upon tip-toe to drop into the mouth of the great fat baby towering above her a green caterpillar which she held in her bill.

"That is Mrs. Vireo, my mate, and her foster child," continued the speaker. "The egg of the cowbird being larger than her own, received all the warmth of her breast, so that her own little ones perished in the shell. It takes all her time and strength to feed that great hulking baby, who will accept her nurs-

ing long after he can take care of himself, then desert her to join his own tribe in the grain fields."

"Last year my mate had no better sense than to brood one of Mrs. Cowbird's eggs," said Mr. Chipping Sparrow. "It emerged from the shell first, of course, and in attending to its everlasting clamor for food she neglected her own birdlings so that all but one of them died. That one has always been a puny, weak little thing. We were greatly astonished, I assure you, at the size of our first offspring, neither of us being acquainted with the habits of Mrs. Cowbird, and disappointed that in neither feather nor feature it resembled her or me."

"I got the best of the lazy tribe, this year," chuckled Mr. Yellow Warbler. "Our nest was just completed, and my mate had deposited one egg, when in our absence one day Mrs. Cowbird sneaked in, laid one of her own beside it and then stealthily crept away. My mate said nothing, and might have brooded it with her own, but the next day the same thing, in our absence, occurred again; another female of the lazy tribe, I presume, finding our home quite to her liking."

"Two to one," said the Chat with a laugh, "that was not fair. Well, what did you do then?"

"Why we concluded to abandon the nest and build another, but on second thought gave up that plan. We simply built a floor over the lower portion of the nest, and on the upper floor, or second story, so to speak, my mate deposited four eggs, those, with the one shut in with the Cowbird's, making her full complement, you see."

"It would have been far easier, it seems to me," said Mr. Towhee, "to have thrown Mrs. Cowbird's eggs out of the nest as we did. But then you and your mate must learn by experience and you will know better what to do the next time."

"Doubtless," said Mr. Yellow-throat, a trifle stiffly, "but my mate is a very dainty bird and wouldn't for a moment think of using a cradle for her little ones that had been occupied, even for a short time, by two female tramps."

"Hm!" replied Mr. Towhee, in his turn not altogether pleased, "that accounts probably for the number of abandoned nests one meets with every year, containing a speckled egg of Mrs. Cowbird's. Too dainty, indeed!"

"Did you ever happen to see one of the homeless creatures seeking somebody's else nest in which to lay her egg?" interrupted Mr. Chipping Sparrow, scenting a quarrel in the air. "I saw one in the woods once sneaking through the undergrowth, and when Mr. and Mrs. Red-eyed Vireo had flown away for a little time, out she crept, inspected their nest, and, finding it to her taste, entered and deposited her egg. She felt sure, you see, that Mrs. Vireo had a kind heart and would hatch out the foundling with her own."

"And she did," sadly said Mr. Vireo, "she did."

"The company the tribe keeps is no better than themselves," said Mr. Wood Thrush. "During the breeding-season you will see the grackles, and red-winged blackbirds, and the cowbirds chattering and gossipping together, as they roost for the night. They are a lawless crew. No self-respecting bird will be found in such company."

"I saw a number of the cowbird tribe perching on the backs of a bunch of cattle in the pasture-land to-day," said a very young Mr. Flycather. "What do you suppose they were doing?"

"Searching for parasites," gruffly said an old bird; "that's the reason they are called cowbirds. They were once called 'buffalo birds' for the same reason."

No one spoke for the space of several minutes.

"If there are no further remarks, said Mr. Red-eyed Vireo, "the question will be put. All in favor—"

"What is the question, Mr. Chairman?" meekly asked a very young Mr. Flycatcher.

"Is it or is it not our duty to destroy every egg of Mrs. Cowbird's we find in our nests, thus forcing the tribe to build homes of their own in which to bring up their familes? All in favor—"

"Ay," chirruped every bird at once.

"Contrary minded?"

There was no response, so the meeting was declared adjourned.

THE NARCISSUS.

WILLIAM KERR HIGLEY,
Secretary of The Chicago Academy of Sciences.

THE genus of plants called Narcissus, many of the species of which are highly esteemed by the floriculturist and lover of cultivated plants, belongs to the Amaryllis family (*Amaryllidaceæ.*)

This family includes about seventy genera and over eight hundred species that are mostly native in tropical or semi-tropical countries, though a few are found in temperate climates.

Many of the species are sought for ornamental purposes and, on account of their beauty and remarkable odor, they are more prized by many than are the species of the Lily family.

In this group is classed the American Aloe (*Agave americana*) valued not only for cultivation, but also by the Mexicans on account of the sweet fluid which is yielded by its central bud. This liquid, after fermentation, forms an intoxicating liquor known as *pulque.* By distillation, this yields a liquid, very similar to rum, called by the Mexicans *mescal.* The leaves furnish a strong fiber, known as vegetable silk, from which, since remote times, paper has been manufactured.

The popular opinion is that this plant flowers but once in a century; hence the name "Century Plant" is often applied to it, though under proper culture it will blossom more frequently.

Other plants of equal economic and historic interest, but less known, belong to this family. It is said that one species furnished the fluid used by the Hottentots for poisoning their arrows.

The genus Narcissus derives its name from a Greek word meaning "stupor" because of the narcotic effect produced by the odor and by portions of the plants of some species.

There are about twenty-five species, chiefly natives of southern Europe, but some of them, either natural or modified by the gardener's art, are world-wide in cultivation.

Blossoming early in the season they are frequently referred to as "harbingers of spring." The flowers are handsome, large, varying in color from yellow to white and sometimes marked with crimson. They are usually borne on a nearly naked stem. Some of the species are very fragrant. The leaves are elongated, nearly sword-shaped and usually about a foot in length, rising from the bulbous underground stem.

Among the forms that are familiar are the daffodils, the jonquils, and the poet's narcissus.

An interesting feature in the structure of the flowers is the cup or crown, which is found at the base of the flower segments. The length and character of this is an important feature in the separation of the species.

In Grecian mythology Narcissus was the son of the river god, Cephissus. He failed to return the love of the mountain nymph, Echo, which so grieved her that she pined away till nothing remained but her voice, which gave back with absolute fidelity all sounds uttered in the hills and dales.

Narcissus was punished for this by Aphrodite, who caused him to love his own image as it was reflected in the water of a neighboring fountain. "Consumed with unrequited love, he too, wasted away and was changed into the flower which bears his name."

FASHION'S CLAMOR.

E. K. M.

JUDGING from late millinery creations, and the appearance of windows and showcases, women, in spite of the efforts of the Audubon societies, still elect to adorn themselves with the stuffed remains of rare or common birds.

A live bird is a beautiful and graceful object, but a dead duck, pigeon, or gull peering with glassy eyes over the brim of a woman's hat is, to the thinking mind, both unbecoming and repulsive. In deference to "sentimental" bird lovers and at the same time the behest of Dame Fashion, wings and breasts are said to be manufactured out of bits of feathers and quills which have all the appearance of the original. Wings and breasts, yes, but never the entire creature, which the bird lover—in a millinery sense—chooses above all other adornments for her headgear. Apart from the humanitarian side of the subject, one cannot but marvel that such women cannot be brought to regard the matter from the esthetic point of view.

"Esthetic," repeats my lady, glancing admiringly in the mirror at the death's head above her brow, "esthetic point of view, indeed! Why, the point of view with most women is to wear whatever they consider becoming, striking, or *outré*. Now I flatter myself in selecting this large gull with spreading wings for my hat, that I attained all three of these effects, don't you?"

"Especially the *outré*," muttered one of her listeners, at which my lady laughed, evidently well pleased.

Five women out of every ten who walk the streets of Chicago and other Illinois cities, says a prominent journal, by wearing dead birds upon their hats proclaim themselves as lawbreakers. For the first time in the history of Illinois laws it has been made an offense punishable by fine and imprisonment, or both, to have in possession any dead, harmless bird except game birds, which may be "possessed in their proper season." The wearing of a tern, or a gull, a woodpecker, or a jay is an offense against the law's majesty, and any policeman with a mind rigidly bent upon enforcing the law could round up, without a written warrant, a wagon load of the offenders any hour in the day, and carry them off to the lockup. What moral suasion cannot do, a crusade of this sort undoubtedly would.

Thanks to the personal influence of the Princess of Wales, the osprey plume, so long a feature of the uniforms of a number of the cavalry regiments of the British army, has been abolished. After Dec. 31, 1899, the osprey plume, by order of Field Marshal Lord Wolseley, is to be replaced by one of ostrich feathers. It was the wearing of these plumes by the officers of all the hussar and rifle regiments, as well as of the Royal Horse Artillery, which so sadly interfered with the crusade inaugurated by the Princess against the use of osprey plumes. The fact that these plumes, to be of any marketable value, have to be torn from the living bird during the nesting season induced the Queen, the Princess of Wales, and other ladies of the royal family to set their faces against the use of both the osprey plume and the aigrette as articles of fashionable wear.

If this can be done in the interest of the white heron and osprey, on the other side of the water, why cannot the autocrats of style in this country pronounce against the barbarous practice of bird adornment entirely, by steadfastly refusing to wear them themselves? The tireless energy of all societies for the protection of birds will not begin to do the cause among the masses so much good as would the total abandonment of them for millinery purposes by what is termed society's 400.

FROM KŒHLER'S MEDICINAL-PFLANZEN.

CVEA.

CHICAGO:
A. W. MUMFORD PUBLISHER.

COCA.*

(*Erythroxylon Coca Lam.*)

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy.

It is an aromatic tonic and cerebral stimulant, developing a remarkable power of enduring hunger and fatigue.—*Gould: Dictionary of Medicine.*

AT THE very outset I wish to state that coca is in no wise related to cocoa, a mistake which is very often made. The term coca, or cuca, as it is sometimes spelled, applies usually to the leaves of *Erythroxylon coca*, which are used as a stimulant by the natives of South America and which yield cocaine, a very important local anæsthetic. Cocoa or cacao refers to the seeds of *Theobroma cacao*, from which cocoa and chocalade are prepared, so highly prized in all civilized countries. With these preliminary statements I shall begin the description of coca, hoping at some future time to describe the even more interesting and important cocoa-yielding plant.

Coca and cuca are South American words of Spanish origin and apply to the plant itself as well as to the leaves. The plant is a native of Brazil, Peru, and Bolivia. It is a shrub varying in height from three to ten feet. The leaves resemble the leaves of tea in general outline. The margin, however, is smooth and entire, the leaf-stock (*petiole*) short; upper and lower surfaces smooth; they are rather thin, leathery, and somewhat bluish-green in color. The characteristic feature of the leaf is two lines or ridges which extend from the base of the blade, curving out on either side of the midrib and again uniting at the apex of the leaf. The flowers are short pedicled, small, perfect, white or greenish-yellow, and occur singly or in clusters in the axil of the leaves or bracts. The shrub is rather straggling and not at all showy.

Coca has been under cultivation in South America for many centuries. According to A. de Caudolle the plant was very extensively cultivated under the rule of the Incas. In fact it is generally believed that the original wild stock no longer exists; such eminent authorities as D'Orbigny and Poeppig maintaining that the wild growing specimens now found in South America are plants which have escaped from cultivation. Coca is now extensively cultivated in Peru, Bolivia, Brazil, and other South American countries, particularly in the Andes region. It is also extensively cultivated in British India and in Java. Attempts have been made to introduce it into Southern Europe but without success.

The plants are grown from seeds sown in pots or boxes in which they are kept until they are from eight to ten inches high, after which they are transplanted during the rainy season. Coca thrives best in a warm, well-drained soil, with considerable atmospheric moisture. In the Andes region an elevation of 2,000 feet to 5,000 feet is most suitable. The young growing plants must be protected against the heat of the sun. The maximum growth is attained in about five years.

The leaves are the only parts used although the active principle, cocaine, is present in small quantities in all parts of the plant. As soon as the shrubs are several years old the leaves are picked, usually several times each year. This work is done principally by women and children who pick the leaves by hand and place them in aprons. They are then spread upon large mats, awnings, or cemented floors, and exposed to the sun for from five or six hours to two or three days. During very warm, bright weather drying may be completed in one day. If the process of drying is slow or if it rains upon the leaves they assume a dark color and are of less value. On the first indications of rain the leaves are placed in sheds specially made for that purpose.

Coca leaves have been used for many centuries by the natives of South America who employed them principally as a stimulant, rarely medicinally. The leaves were at one time highly prized.

Acosta states that during the reign of the Incas the common people were not permitted to use the leaves without permission from the governor. After the passing of the Incas and after coca was more extensively cultivated all classes chewed the leaves. Children were, however, not allowed to use them. According to Mariani, the young Indian on arriving at the proper age was sent to an old woman whose duty it was to instruct him and to invest him with authority to chew coca leaves. The native carries the leaves in a little pouch (*huallqui* or *chuspa*) suspended from the belt. This pouch also contains a small bottle-gourd or calabash (*ishcupura*) in which is carried the ash of some plant (species of *Chenopodium*), known as *Llipta*. A few leaves are placed in the mouth and rolled into a ball; a stick moistened with saliva is now dipped into the ash and wiped upon the leaves. The ash is supposed to develop the flavor and to cause a flow of saliva which is either entirely swallowed or partially expectorated. It is said that the use of the leaves enabled the Indians to undergo extreme hardships. A French missionary states that the leaves were absolutely necessary to the slaves employed in the quicksilver mines of Peru. They were also used in dressing wounds, ulcers, and taken internally for the cure of intestinal troubles, jaundice, and various spasmodic troubles. Historians seem to agree that the constant chewing of the leaves by the Indians did not produce any very marked deleterious effects. Mariani, upon the authority of several authors, states that it even seems to be conducive to longevity. The dead of the South American Indians were always supplied with a liberal quantity of coca to enable them to make the long and fatiguing journey to the promised land.

Chewing coca leaves is a habit which may be compared to the habit of chewing tobacco with the difference that the former is by far less injurious though there are good reasons to believe that it is far from harmless. Dr. Wedell says an habitual coca chewer is known as coquero and is recognized by his haggard look, gloomy and solitary habit, listless inability, and disinclination for any active employment. The same authority states further that the habitual use of coca acts more prejudicially upon Europeans than upon the Indians accustomed to it from their early years. Occasionally it causes a peculiar aberration of intellect, characterized by hallucinations.

Chewing coca leaves has never become common among civilized nations. Large quantities of leaves are, however, imported for the purposes of extracting the active principle cocaine, whose effects are very marked. Cocaine causes a feeling of depression, and a marked reduction in the activity of the senses preceded by stimulation. Cocaine solutions are very extensively employed to produce local anæsthesia in minor surgical operations. Dentists employ it very extensively. Its use has several serious drawbacks. Occasionally it produces no effects whatever and again an ordinary medicinal dose has caused fatal poisoning. For these reasons dentists, physicians, and surgeons often hesitate in using it. According to some authorities the poisonous effects are due to a second alkaloid which occurs in the leaves of some varieties of coca. If that is the case, then poisoning may be prevented by excluding these varieties from the market, which is not an easy matter considering that the leaves are collected, dried, and shipped by ignorant natives. It is also known that the active principle is rapidly destroyed, hence the necessity of using fresh leaves. In the course of one year most of the cocaine has undergone a chemical change and the leaves are absolutely worthless. Careless drying also destroys much or all of the cocaine.

Description of Plate.—*A*, flowering branch; 1, bracts, enlarged; 2, flowering bud; 3, flower; 4 and 5, petal with ligula; 6, pistil with stamens; 7, stamen; 8, pistil; 9, ovary, transverse section; 10 and 11, corolla; 12 and 13, fruit.

*Cvea on plate, typographical error; Coca correct.—Ed.

OUR NATIVE WOODS.

REST H. METCALF.

HOW many different varieties of wood are there in your own town? If you never have considered this question you will be surprised at the variety, and, I am sure, will enjoy making a collection for yourself. A pretty cabinet size is two inches in length and the same in diameter. This size is very convenient, unless you have an abundance of room, and will show fibre, grain, and color quite distinctly. If you will plane off two sides of the block you will see the grain plainly, and, if possible to polish one side, you will see what a beautiful finish some of our own woods will take.

All that is necessary in obtaining your collection is a small saw, but a congenial companion will greatly add to your pleasure. Saw your specimen considerably longer than you call for after it is prepared, for most of the varieties will check in drying; then let it thoroughly dry before preparing for your collection. The fruit trees around your home may first take your attention. You will be interested in noting the differences in the grain of the apple, apricot, barberry, cherry, pear, peach, plum, and quince; and while you are becoming interested in the fruit trees, notice the variety of birds that visit the different trees, for you will find each bird has its favorite fruit and favorite nesting-place. The mountain ash will perhaps feed as many birds in the fall and winter as any tree, and is a pretty tree for the lawn, holding its place with the maples, the ever graceful elm, admired by all, except the man who is trying to split it into firewood, and a favorite with the Baltimore oriole. If you wonder why the horse chestnut was so named, just examine the scars after the leaves fall and you will think it rightly named. Who has not tried carrying a horse chestnut in his pocket to prevent rheumatism? The weeping birch, as well as the weeping maple, are much admired for shade and ornamentation, but are not very common. We were told recently that the Lombardy poplar was coming back as a tree for our lawns, but many prefer the balm-of-gilead, so popular for its medicinal qualities. In the United States there are thirty-six varieties of the oak; you will find several in your own town and I trust will add a collection of acorns to your cabinet, and friends from the South and West will help make your collection a complete one. Then you will become interested in the cone-bearing trees and a variety of cones will also be added to your evergrowing collection, you will enjoy gathering some green cones and listening to the report as the seed chambers open, and if you gather a small vial of the common pine and hemlock seeds you will puzzle many a friend. One person remarked, when shown a vial of hemlock seed, "O yes, I have seen something like that, that came from Palestine, but I have forgotten the name." Some of the fir trees are pitted with holes where the woodpeckers insert grub-bearing acorns, leaving the grub to fatten, and in the fullness of time devouring it. Then the trees bearing edible nuts will call for their share of attention. The chestnut is familiar to all, as well as the butternut and hazelnut, but I knew one collector who called an ash tree butternut. There are twelve varieties of ash in our country, a wood that is coming more and more into prominence, and deservedly so; its toughness is proverbial, and it has long been utilized by carriage-makers for certain parts of wheels. A fine, handsome wood, combining in itself the qualities of oak and pine.

There are eighteen varieties of willow, several of the alder, but throughout the United States there is only one kind of beech. The ironwood is often wrongly called the beech. The hard and soft pine are interesting trees. The soft especially is a favorite for the sawyer, a beetle with long horns, who cuts large

holes through the wood. When obtaining your specimen from the thorn tree you may be fortunate enough to see the shrike getting his breakfast from the thorns where he had placed it some time before. The locust with its fragrant racemes of white blossoms in the spring and long seed pods in the fall will call for attention, and you may perhaps receive, as I did, a locust seed from the tree planted by George Washington at his Mount Vernon home many years ago. The shumachs and white birches are very artistic and sought out by all artists, for who does not want to put a white birch into a landscape! Every one knows the black birch by its taste. The laurel has a pretty, fine grain. The witch hazel is another favorite for its medicinal qualities as well as its popularity for being the last blossom of the autumn. And many others will be added from the shrubs and vines until your collection, just from your own town, will number nearly, if not quite, one hundred. You will thus, too, have become interested in all nature and will be able more fully to appreciate all the beautiful things God has given us to use and enjoy.

BIRD WORTH ITS WEIGHT IN GOLD.

POSSIBLY the rarest of all feathered creatures is the "takahe" bird of New Zealand. Science names it *Notornis Mantelli*. The first one ever seen by white men was caught in 1849. A second came to white hands in 1851. Like the first it was tracked over snow, and caught with dogs, fighting stoutly, and uttering piercing screams of rage until overmastered. Both became the property of the British museum. After that it was not seen again until 1879. That year's specimen went to the Dresden museum at the cost of $500. The fourth, which was captured last fall in the fiords of Lake Te Anau, in New Zealand, has been offered to the government there for the tidy sum of $1,250.

Thus it appears that the bird is precious; worth very much more than its weight in gold. The value, of course, comes of rarity. The wise men were beginning to set it down as extinct. Scarcity aside, it must be worth looking at—a gorgeous creature about the size of a big goose, with breast, head, and neck of the richest dark-blue, growing dullish as it reaches the under parts. Back, wings, and tail-feathers are olive-green, and the plumage throughout has a metallic lustre. The tail is very short, and has underneath it a thick patch of soft, pure white feathers.

Having wings, the takahe flies not. The wings are not rudimentary, but the bird makes no attempt to use them. The legs are longish and very stout, the feet not webbed, and furnished with sharp, powerful claws. The oddest feature of all is the bill, an equilateral triangle of hard pink horn. Along the edge, where it joins the head, there is a strip of soft tissue much like the rudimentary comb of a barnyard fowl.

"Around the glistening wonder bent
The blue wall of the firmament;
No clouds above, no earth below,
A universe of sky and snow."

—*Whittier.*

FROM COL. F. NUSSBAUMER & SON.
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RED-TAILED HAWK.
⅓ Life-size.

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THE RED-TAILED HAWK.

(*Buteo borealis.*)

C. C. M.

UNTIL recently the red-tailed hawk was classified with the obnoxious hawks which prey upon birds and poultry, but the Department of Agriculture instituted an investigation of this species and concluded that it has a far worse reputation with the average farmer than it deserves. The late Major Bendire asserts that, while it does capture a chicken or one of the smaller game birds now and then, it can readily be proved that it is far more beneficial than otherwise and really deserves protection instead of having a bounty placed on its head, as has been the case in several states. The red-tailed buzzard, as it is sometimes called, in its light and dark geographical races, is distributed throughout the whole of North America. Its food is chiefly small quadrupeds, red squirrels, gophers, and moles, and the remains of these rodents may be found in this bird's nest containing young. Where this hawk is found these small animals are most abundant. Longfellow in the "Birds of Killingworth," among the "Tales of a Wayside Inn," has written a defense of the hawks that the Audubon societies might well use as a tract.

The nest of the red-tail is placed in high trees in deep woods; it is large and bulky, though comparatively shallow, and is made of sticks and twigs mixed together with corn husks, grass, moss, and on the inside may be found a few feathers. It is said that sometimes the deserted nest of a crow or that of another hawk is fitted up and used. Mr. J. Parker Morris records a nest occupied first by the great horned owl and afterwards by the red-tailed hawk each year. The young owls leave the nest before the hawk is ready to occupy it. Two or three, rarely four, eggs are laid. Eggs are found as late as the middle or latter part of May. They present many differences in size and markings; their ground color is white or bluish white, some are entirely unmarked, while others are very heavily blotched and splashed with many shades of red and brown; and Davie says some are faintly marked here and there with a light purplish tint, and again the colorings may form an almost confluent wreath at either end. The average size is 2.36 by 1.80.

In old paintings the hawk is represented as the criterion of nobility; no person of rank stirred without his hawk in his hand. Harold, afterwards king of England, going on an important embassy into Normandy, is drawn in an old bas-relief, embarking with a hawk on his fist. In those days it was sufficient for noblemen's sons to wind the horn and carry the hawk.

According to Mr. Horace A. King this is one of the commonest birds of prey to be found in northern Illinois. They may be met with in all sorts of places, but are most common in the vicinity of heavy timber. In driving through the country one will see them perched upon rail fences, trees by the wayside, sitting on the ground in stubble or pasture fields, or soaring over fields in search of their prey. When on one of his foraging expeditions, the red tail, on sighting his quarry, will remain at the same place in the air by a continual flapping of the wings, when at the proper time he will dart swiftly and silently upon it.

Mr. Claude Barton, while rowing up Flat river recently, came upon six mallards. At sight of him the birds took flight, following the river. About two miles further up the stream he again came upon the same flock. There were four ducks and two fine drakes. He hid his boat in the rice and watched them. All at once a large red-tailed hawk dashed into the flock. The ducks, with the exception of one, dove, and this one took wing, a swift pursuer following. The hawk did not seem to gain on his prize, and the poor duck was screaming with terror. Had the duck sought safety in the water it would probably have escaped, but it was too frightened apparently to think of it.

A TRANSPLANTING.

ALICE WINSTON.

IT WAS the kitten who did it, though no one knew but Martha. Aunt Jenny thought it was the work of Providence and Aunt Amy thought it was the result of her own smiles and caresses. Aunt Mary never thought about it at all, of course. But really it was the kitten. And what was this thing that the kitten accomplished? The taming of Martha. And why did Martha need taming? Because she came at twelve, a very barbarian, with freckles and unmanageable hair, under the dominion of three smooth-locked ladies, who never had a freckle and whose hair had always been smooth.

Perhaps it would be better to begin at the beginning which was twenty years before there was any kitten. Most serene and happy would have been the lives of the three Miss Clarkes, if it had not been for Arthur. Arthur was their brother, and the combination of prim, blonde girls and harum-scarum black-eyed boy, made a most surprising family. The son and heir was not looked on as a success by his sisters and the other staid and respectable citizens of Summerfield. He did not join the church and he did not go to college, he wedded no one of the many eligible town's daughters, and, lastly, on his father's death he did not settle down at home, to take care of his property and his sisters.

This last of his misdeeds had made a breach between himself and his sisters. The more serious, because of the very deep affection which lay at the bottom of their half apologetic demeanor toward their brother. The difference between them was augmented by his removal to a far western town and his marriage with one of the natives. For the next twelve or thirteen years they never saw him and heard of him but seldom. Then he died suddenly, after accomplishing his task of wasting all his money.

So it happened that Martha saw her aunts for the first time on the day of her father's funeral, and her dim recollection was of cold faces and mannerisms which worried her mother. Martha was the eldest of four and her mother was one of the ornamental of earth, and her father one of the restless. So the first eleven years of her existence was wandering up and down through many cities, attended with much care for her slender shoulders, and an amount of worldly experience such as forty years of life had not given to the elder generation. Then her father died and they all went to share the spendthrift poverty of the home, whence her mother drew her ideas of domestic economy.

Through wifehood and widowhood, to her deathbed, Mrs. Clarke clung to an unreasoning hate of her sisters-in-law, and a dread of the time when her children must come into their hands kept her struggling against death for months.

But just one month after her pitiful fight was over, Martha started for Summerfield.

Poor Martha! Never captive carried to slavery felt such dread as did she on her eastward journey. When the friend who had borne her company left her at a station near Summerfield, even the stoicism of Martha gave way before the horror of the unknown and she clung to the last landmark of her old life, with a sobbing eagerness, which even a carefully nurtured child might know.

But there was no trace of frail, human grief in the little maiden who lifted the sullen blackness of her big eyes to Aunt Jenny's face that evening, who received Aunt Mary's greeting with a self-possessed composure alarming to that shy and gentle lady, and who gave the same degree of cold attention to Aunt Amy's sweet speeches.

They had looked forward to the coming of Arthur's daughter with a strange mixture of excitement, pleasure, and dread. The dread was predominant now. For this stern little woman was not their flesh and blood, not the child

of their brother, but of the woman who had kept them apart from their brother in his trouble and sickness and death.

Martha was quiet and docile enough. In fact she did what she was told with a resignation most depressing. Aunt Jenny took her to church and the sight of her critical dark eyes roving over minister and congregation spoiled the sermon for Aunt Jenny. Aunt Mary told her stories of her father intended to be gently humorous. In the midst of them Martha jumped up and ran off into the garden. She cried there for half an hour, but nobody ever knew, and this business lost her the little hold she had had on Aunt Mary's heart. Aunt Amy tried to amuse her and took her to Sunday-school, and to the Band of Hope. She gave her a doll and invited the neighbor's children to come and take tea. The doll was a source of secret amusement to Martha, but the visits of these pretty and proper children were trials which she could scarcely bear with patience.

All the while, as the aunts half suspected, she was criticising everything that came within the ken of her hungry eyes. She found Aunt Jenny imperious, Aunt Mary dull, and knew that Aunt Amy was thinking of her sweet smile as she smiled. For Martha was outside of it all, a mere spectator of this life of peace and quiet and plenty, and she secretly hungered after something to care for—something to take the place of the little brothers and sisters who had always run to her to have their faces washed and their aprons buttoned. They expected her to play with dolls, she, Martha Clarke, who had had real work to do and had learned to push and crowd her own way.

Months went by and the barrier was unbroken. One evening the tea bell rang again and again without bringing any Martha. The aunts were in consternation. Had she run away or was it a case of kidnaping? After nearly an hour the suspense was ended by the arrival of Martha. But such a Martha! Her neat raiment was muddy and torn. Her hair was in shocking disorder, Her right hand, tied up in a handkerchief, was emphatically bloody, but in spite of this, it was used to steady her bonnet, which she carried by the string, basket-wise, in her left hand.

Exclamations of horror and surprise burst from the astonished women. "Martha, where have you been? What have you been doing? What is the matter with your dress? Have you hurt your hand? Why, it's bloody! Has the child been fighting? Martha, are you going to answer?"

Martha was actually embarrassed. As she advanced into the lamplight they saw that her cheeks were crimson and her eyes sparkling, also that the contents of her bonnet was a dilapidated kitten. When she did speak, her voice was shriller than usual.

"I fell down in the mud and my hand is hurt," was her meager and hesitating answer.

"Where did the cat come from?"

"It isn't a cat, it's a kitten, and it was out in the yard, and I tried to catch it and it ran away and a dog chased it. When I came up, the dog was eating the kitten, and I hit him and then he bit me and pushed me down in the mud. But I'm going to keep the kitten." The last defiantly, then on second thought, she added:

"If you please. It's awfully hurt, that kitten."

In the silence that followed the shrill child-voice the aunts looked at each other and one thought was in the mind of each. "She looks like Arthur."

When Martha went to bed that night the kitten, with its wounds all dressed, was slumbering peacefully before the kitchen fire.

Time passed on happily for the kitten, which was not very much injured after all, and full of new interest for Martha, who plunged head and soul into the education of the kitten. Toward her aunts her feeling was unchanged. She drew a line between them and the kitten.

One evening Aunt Jenny and Aunt Amy had gone to prayer-meeting. Aunt Mary was not well and she sat bolstered up in a rocking-chair, knitting, before the bright fire in the sitting-room grate. Martha sat beside her, also knitting, in theory, but in practice carrying on a flirtation with the kitten, which was now a very gay kitten, in-

deed. An empty rocking-chair stood very near the fire and the kitten was leaping back and forth between its chair and Martha's, making its attacks with much caution and its retreats with much speed. Aunt Mary was sleepily watching the fun.

Suddenly there was a loud crash. The kitten had fallen into the fire in such a fashion as to knock over the rocking chair in front of the grate. It was a prisoner in the fiery furnace.

Many years had passed since Aunt Mary had moved so quickly. She threw herself at the rocking-chair and flung it to one side. She snatched up the unfortunate kitten and made one rush to the kitchen and the kerosene can, and by the time Martha overtook her, was soaking the poor little burned paws.

Half an hour later when Aunts Jenny and Amy opened the sitting-room door, an astonishing sight met their eyes. The firelight redness flickered over the excited faces of Martha and Aunt Mary laughing and talking eagerly together, Martha no longer dignified and Aunt Mary no longer shy. That was the beginning of the end, but Aunt Mary was always Martha's favorite.

And it was the little kitten who did it.

TWO BIRD LOVERS.

SUNDAY afternoon the birds were sweetly mad, and the lovely rage of song drove them hither and thither, and swelled their breasts amain. It was nothing less than a tornado of fine music. I kept saying, "Yes, yes, yes, I know, dear little maniacs! I know there never was such an air, such a day, such a sky, such a God! I know it! I know it!" But they would not be pacified. Their throats must have been made of fine gold, or they would have been rent by such rapture-quakes. — *Mrs. Nathaniel Hawthorne, in a letter to her mother.*

Lovely flocks of rose-breasted grosbeaks were here yesterday in the high elms above the springhouse How very elegant they are! I heard a lark, too, in the meadows near the lake, the note more minor than ever in October air. And oh, such white crowns and white throats! A jeweled crown is not to be mentioned beside theirs—such marvelous contrasts of velvets, black, and white! Swamp sparrows, too, and fox sparrows—I saw both during my last drive.—*From letter to Ed., from Nelly Hart Woodworth, Vermont, Oct. 20, 1899.*

WINTER TIME.

ROBERT LOUIS STEVENSON.

Late lies the wintry sun a-bed,
A frosty, fiery, sleepy-head;
Blinks but an hour or two; and then,
A blood-red orange sets again.

Before the stars have left the skies,
At morning in the dark I rise;
And shivering in my nakedness,
By the cold candle, bathe and dress.

Close by the jolly fire I sit
To warm my frozen bones a bit;
Or, with a reindeer-sled, explore
The colder countries round the door.

When to go out, my nurse doth wrap
Me in my comforter and cap,
The cold wind burns my face, and blows
Its frosty pepper up my nose.

Black are my steps on silver sod;
Thick blows my frosty breath abroad;
And tree and house, and hill and lake,
Are frosted like a wedding-cake.

THE MARYLAND YELLOW-THROAT.

(*Geothlypis trichas.*)

C. C. M.

ONE of the first birds with which we became acquainted was the Maryland Yellow-thoat, not especially because of its beauty but on account of its song, which at once arrests attention. *Wichity, wichity, wichity, wichity*, it announces from some thicket or bush where it makes its home. It is one of the most active of the warblers and is found throughout the United States, Canada, and Nova Scotia; in winter it migrates to the South Atlantic and Gulf States and the West Indies.

The nest is not an easy one to find, being built on the ground, under the foot of a bush or tussock of rank grass, sometimes partly roofed over like the oven bird's. The eggs are four or five, rarely six in number, creamy-white, speckled, chiefly at the larger end, with reddish-brown, dark umber, and black; in some, occasional lines or scrawls appear. The average size is .69 x .52 inches. Oliver Davie says that the best description of this bird's song was given by Mr. Thomas M. Earl. One evening in May, 1884, he was returning from a day's hunt, and, after a rest on an old log, he was about to start on his journey homeward. At this instant a little yellow-throat mounted a small bush and, in quick succession, said: *Tackle me! tackle me! tackle me!* The fact is, the yellow-throat has several notes and is rather noisy for so small a bird. It is known by other names, as black-masked ground warbler, black-spectacled warbler, brier wren, and yellow brier wren.

The female is much duller in color than the male, without black, gray, or white on head. The young are somewhat like the adult female.

BOB-O-LINK.

GRANVILLE OSBORNE.

Soaring high up in the bright blue sky,
Can't keep track of him if you try;
Flitting around in the pasture lot,
Likes to be friendly, rather than not;
Dancing along on the old rail fence,
Sunshine and flowers where the woods commence;
Got so he almost talks to me;
Head a-nodding, he says, says he—
"Bob-o-link, o-link, o-link."

Clover and buttercups just seem to try
Coaxing him up in the meadow to fly;
Bees hunting honey keep buzzing around,
Seem to know best where the sweetest is found,
Almost forget when a-hearing him sing
What kind of honey they all came to bring;
Pert and saucy as he can be,
Tail a-flitting, he says, says he—
"Bob-o-link, o-link, o-link."

Wings jet black and glossy as silk,
Waistcoat a-gleaming as white as milk;
Dainty and slender, quicker than light,
First in the morning, last one at night,
Perched on the post of the barnyard gate,
Singing his sweetest to waken his mate;
Dressing his feathers and winking at me,
Mincing around, he says, says he—
"Bob-o-link, o-link, o-link."

A STUDY OF THE COLOR PHOTOGRAPH.

THE color photograph is found to be most useful in developing the color sense in children. The act of recognizing various colors and shades is educative. When we consider that all the effects of the color photograph are produced by combinations of the three primary colors we at once step into a realm of thought and observation that is boundless. The danger is that we may attempt too much with the abundance of material at hand and, by forgetting the limitations of the unformed mind, confuse instead of enlighten.

It is well for the teacher to know the process by which the color photograph is produced, but young children who know little of the laws of light are not expected to understand it fully. In advanced classes the following will be found beneficial:

A natural object is placed before a camera and a water screen is adjusted so no rays but the yellow may reach the photographic plate. A negative is thus obtained recording all the yellow that appears upon the surface of the object, whether it shows as pure yellow or in combination with other colors. With the camera and object in exactly the same position and another screen which absorbs all the rays but the red ones coming from the object, a negative of the red is obtained. A third negative of the blue in the object is similarly got, and we have an accurate representation of the form and all the colors of the object separated into red, yellow, and blue.

From these negatives three half-tone plates are made upon copper. A half-tone plate is an acid etching produced by photographic process with fine lines crossing each at right angles so that the picture appears as a series of microscopic square points which decrease in size in the lighter portions of the plate.

Red, yellow, and blue inks of the rarest quality are used in printing from these plates, with great care exercised as to getting the exact depth of color required for each. By placing a sheet of fine tissue paper beneath a plate printing red, the red is deepened, another sheet makes it more intense, and others are placed under the plate, if necessary, to get the rich red required to blend with the yellow and blue to make the exact reproductions of nature's colors which appear in the color photograph.

The order of the printing is yellow first, and when this is thoroughly dry the red is laid on, and the blue a day later. As the color is nowhere a solid mass, but a series of points, one color does not hide another, but the three colors shine through and make the blendings which appear in the beautiful and delicate shades and tints of the color photographs.

Do not manifest surprise when you find pupils wholly or partly color blind. The boy who cannot find a red marble in the grass will show by his conversation that red and green are the same to him. His is an extreme case, but there are many who are slow to name the primary colors and totally fail to recognize differences in tints.

For ordinary purposes there should be little effort given to the naming of the shades. If the colors are talked about by name, enough is done in the line of language. But classes become readily interested in comparing reds, and blues, or greens to say which is the deeper or the purer. The location of a patch of color often changes its apparent intensity. Contrast with sur-

roundings may deceive the eye. Whistler has used Naples yellow so the observer declares it pure white.

A good exercise in color recognition is given in choosing masses of color on the picture and telling what primary colors are in them; also in comparing two masses and saying which appears to have the more red or yellow in it.

Where the class have water colors excellent practice may be had in selecting and mixing colors to correspond with a given one. The mixing should be first tried without placing the mixed mass beside the copy. Very young children often make surprisingly accurate judgments of color, and no game pleases them more than a mixing contest, having the game decided in each instance by placing the best work beside the original.

No pictures have inspired so many young people with a desire to copy as have the color photographs. Their perfection of detail has not discouraged such attempts. The more easily copied lithograph has no such fascination. This shows that the nearer we approach nature in any presentation the more strongly we appeal to human nature and draw out its latent powers.

THE PILEATED WOODPECKER.

BELLE P. DRURY.

THIS noble bird may be found in wooded districts of Illinois, but I made its acquaintance in the Indian Territory, where it is quite common.

In size and beauty of color it is second only to the ivory-billed.

The Choctaw Indians told me it was the "Good God" bird. I asked what they meant by that designation. The reply was "Only listen and you will know."

For days I spent much time watching several pairs as they flew about among the trees on the Shawnee Hills, but the only sound I heard was the hammering of their strong stone-colored bills on the sides of the trees, a noise that might easily be heard a quarter of a mile away. They did not descend to fallen logs for their prey but made the chips and bark fly from the upright trees.

Naturalists say the pileated will occasionally leave the insect-laden trees in search of fruit and grain, a thing the ivory-billed never does.

My beautiful, noisy companions eyed me and my opera glass suspiciously, trying always to keep on the other side of the tree from me, and, for a time, gave me no hint of the reason for their Indian name.

But at last a hunter appeared upon the scene when the frightened birds bounded away through the air uttering a cry which did indeed resemble the words "Good God," spoken in gutteral tones. The marksman brought down a fine specimen, which he gave to me. With magnificent red top-knot and wide-spread wings it looks as if it might be longing to fly back to its home among the Shawnee Hills.

THE LYRE-BIRD.

(*Menura superba.*)

LYNDS JONES.

IF AUSTRALIA were noted for no other thing than the ancient and strange animal forms which are to be found nowhere else on the earth, it would still be a wonderful continent. Not the least remarkable of these forms is the lyre-bird, the subject of the present sketch. Since its discovery on January 24, 1798, by one Wilson, it has been handed about among the different orders of birds by different systematists until its anatomy seemed to give it a more or less permanent place among the birds of passerine form, in spite of its fowl-like build and strong legs and large feet.

The appearance of the bird, except the superb tail, is not remarkable; but paradoxical as it may be, the tail is the bird's crowning glory, at once giving it a name and fame. Like many other cumbersome things, the lyre-bird's tail is used for ornament during a part of the year only, being donned at the mating season and doffed at the close of the nesting period. It assumes the lyre-shape only when voluntarily spread, appearing simply as a long, greatly developed tail at other times. The bird throws up a mound of earth, dome-shaped, which serves as a raised platform or stage well suited to tail spreading and other courting antics. Strutting and wing-dragging are accompaniments of the tail-spreading, and strongly suggest gallinaceous affinities, especially since the bird is the size of the ordinary barn-yard fowl.

In habits the lyre-bird is lowly, preferring the ground to bushes or trees, and running from danger rather than flying, the strong legs and feet permitting a swift retreat. Rarely the bird may mount a tree, ascending branch by branch instead of flying up at once. They are said to use the wings to aid them in running, and in hopping upward in the trees. They are so wary and timid that it is difficult to secure specimens except by resorting to deception or the use of dogs. The barking of the dogs drives them into the trees, allowing the hunter a fair mark. They are inhabitants of the dense brush from which it is next to impossible to dislodge them.

Authorities agree that the lyre-bird's powers of song are remarkable. It seems to have the power of mocking almost every other bird, as well as the barking of the dingo, besides possessing a sweet song of its own. One author states that for the first two hours of the morning it repeats over again its own song, then gradually changes it to imitate other birds, ending its four-hour song period with imitations of all the other birds within hearing, then remaining silent for the rest of the day,

The nest is a dome-shaped affair with the opening in one side, made of "small sticks, interwoven with moss and fibers of roots." "The single egg laid is of a very dark color, appearing as if it had been blotched over with ink." The young emerges from the egg a downy white ball, perfectly helpless, and remains in the nest for several weeks. The food seems to consist of insects, myriapods, and snails, of which large quantities must be destroyed to satisfy a bird of this size.

This is another of the world forms which are doomed to complete extinction. It is to be earnestly hoped that the time of its disappearance will await a more careful study of its habits than has been accomplished thus far. A study of these curious forms can hardly fail to throw much light upon the development of the bird fauna of the world.

ROBERT AND PEEPSY—THE TWINS.

NELLY HART WOODWORTH.

IN THE latter part of May a pair of Baltimore orioles built a nest in my maples, from which, eventually, a brood of noisy fledglings were launched upon the world. A quantity of Hamburg embroidery was woven into the nest and festooned gracefully from the outside.

This was obtained from my neighbor's washing as it lay bleaching upon the grass, a task demanding more time and strength than seemed necessary for useless ornamentation.

To all appearance the esthetic taste of the builders was more pronounced than was their family discipline.

The children were a clamoring, rollicking group, pushing each other about and insisting, forcibly, upon a high point of view that constantly threatened their frail lives. I was in constant fear lest they come tumbling down and it was not long before my worst fears were realized.

They fell, with a shower, upon the morning of the 23rd of June, tumbling pell-mell into the strawberry bed, the biggest baby picking himself up in a hurry, and climbing upon one of the fence wires.

The other nestlings were marched off by the head of the family to other fields of observation, the first little bird hopping from the fence to a wild rose-bush that grew beside the kitchen door.

There he was fed by his father during the day; as his mother did not appear I inferred that she had her hands full with the other children.

Neither parent appearing the next morning, the first baby was put into a grape basket upon the window-sill.

Before noon the old birds came; the wire netting was removed from the window, both parents coming at short intervals into the kitchen with food.

To my surprise they did not return the following morning, when I fully intended to speed the parting guest, though the little one was placed in a cage outside the door. The helpless infant was left in an orphaned condition to my care; he could not feed himself, nor did he understand, under my tutelage, how to open his beak when food was brought. It was necessary to pry it open, the lunches coming so often that nearly all my time was spent in attending to his meals. That very evening the chore-boy brought a lank, long-legged bobolink which was given into my keeping only because it was threatened with starvation.

Like the oriole he was too young to feed himself and had been for twelve hours without food.

A more uninviting specimen of babyhood could not be imagined, forlorn, ragged, with unfeathered spaces upon his homely little body; but, though he had none of the oriole's commanding beauty, he was sure to perish unless regularly adopted and his infant wants supplied.

He was placed in the cage while the oriole was taking a nap, the introduction prefaced by being stuffed till his bare little crop was as round and full as an egg. Mrs. Olive Thorne Miller, who was with me at the time, assisted at the christening of the pair.

As the oriole was always peeping we called him "Peepsy;" the bobolink was named "Robert" with due respect to the Robert-o-Lincoln family.

They were oftenest called "the twins," and troublesome twins they were, waking me at three o'clock each morning and crying loudly for their breakfast, which was prepared the previous evening.

Peepsy was first taken in my hand and given a few mouthfuls, then Robert's turn came, after which Peepsy was thoroughly fed and when Robert's demands were appeased, both birds were returned to the cage for another nap.

After sleeping innocently for another hour they awoke, insisting with emphatic protest upon an immediate supply of rations.

There were times when they jerked their heads from side to side and not

a morsel was safely lodged or appropriated, persisting in the clamor until, after patient effort, both little creatures were satisfied at last.

As may be surmised this was no enviable task, though the twins went promptly to bed at dusk leaving me free for the evening.

Peepsy was far the brighter bird. He took the lead at first, helping himself to his meals at times, twinkling the soft brown wings at my approach with most flattering evidences of favor.

Robert was a different bird; he scratched and bit, flopped about and hissed out his disapprobation.

The last was not without compensations. Whenever his beak was opened wide in disapproving hisses the opportunity was seized to fill it with food.

Sometimes his tactics changed; he would throw back his head and refuse to swallow. In a short time he took on prettier ways, now and then coaxing a little while receiving his meals with dainty baby eagerness.

From first to last their tastes diverged; Peepsy was high-born, Robert was of low degree. These low-born instincts preferring the cage floor he was given a sod to stand upon, the oriole's decided preference for higher stations culminating in the swing, his both by right of preference and forcible possession. In ten days Peepsy began to believe himself a full-grown bird. Then began an investigation of the cage and its appointments, diving into every corner, thrusting himself into the drinking cup as far as its size would allow, playing with the food, and throwing the earthworms given him to the top of the cage before attempting to swallow them. He would thrust his beak into Robert's feathers or catch hold of his legs, while the bobolink with ruffled plumage drew back with becoming indignation. He certainly *was* a homely baby which did not excuse the other twin for putting on airs, regarding him with lofty condescension, or stepping on his big, sprawling feet when they came too near. This unseemly behavior may have accounted for Robert's despondent hours from which he emerged to sing low and tentatively with the tinkling music of falling raindrops. Then they tried to stand upon one foot, balancing with great difficulty meanwhile, crowding into the swing and tumbling out upon the floor together.

In utter indifference to his own toilet Peepsy insisted upon preening Robert's plumage, calling his attention to the matter by vigorous pulls at his tail, or jerking some truant feather that beauty or tidiness required to be smoothed into place.

This unappreciated service was resented with many hisses, darting at the persecutor with wide-open beak and dire threatenings of vengeance, after which they cuddled up lovingly together for a nap.

For several days this self-imposed helpfulness was so officious that the twins were separated lest Robert's temper, not over-good at the best, be permanently spoiled.

On this account Peepsy had the liberty of the house and went oftenest abroad. What with a better disposition and more enticing manners there was no resisting, whether it was coaxing to sit upon my finger or happy as bird could be when admired and caressed.

He would fly to my shoulder, pull a stray lock of hair lying against my throat, dodge skillfully when the hand was raised in protest, only to reappear and bite my lips as they moved in cautioning words.

He followed me to my chamber morning by morning, hopping up the stairs one at a time till we reached the top, when he flew to my shoulder and entered the room master of ceremonies.

As the clothes were replaced upon the bed he darted down upon sheets and blankets on purpose, seemingly, to be "shooed" away. Too much notice was spoiling the child, though his reign, poor baby, was short!

He was quite independent as to feeding himself when Robert first began to pick up cracker crumbs. What was stranger still, when the bobolink was well-versed in such matters, his memory was so unreliable that he forgot how to eat over night and had to be taught all over again for several mornings, nor would he swallow till the egg

or cracker was thrust clear down his throat.

After the first month, in which the oriole took the lead, the order was reversed. Robert was first thereafter, coming to the front and taking entire charge of the establishment, chaperon, servant, adviser, nor was he above making sarcastic remarks at the expense of the faithful companion who followed closely at his heels.

He pecked at the little blue kid shoes on the perch above, pulled the tiny toes, tweaked the feathers and tried to pull them out, and behaved generally, I regret to say, most impolitely. With this increased assurance there was a marked gain in song.

He sang while we breakfasted or dined, the same ideally happy bobolink medley, a new discovery of the joy of living, lifting his voice in rainy days in rhythm with the shower, Peepsy joining with sundry encouraging notes but no real song.

After the first month both birds were fond of the bath; water in bowl, pitcher, or tumbler, was a challenge seldom ignored.

Robert's short memory and inexperience were liable to mistake the dish of cracker and milk for a bath tub, crowding into and flirting the contents over chairs and floor. He was specially fond of my mother, planting his feet in her soft, wavy hair and jerking her locks in utter disregard of all threatening.

The door to the next room, left ajar, was a ceaseless fascination. When the cage door was opened they started promptly, Robert leading, Peepsy following meekly, till they reached the crack in the door, stretching out their necks and peering with curious eyes into the room beyond; then, as if confronted with some terrible ogre they turned quickly about and hopped back to the cage.

The hidden possibilities were too great. In a moment back they came, repeating the search over and over, till the door was thrown open and they were at liberty to explore the terrors and resources of the room beyond. After one of these excursions Peepsy was found fast asleep in the narrow space between the door and the wall!

Both birds were very curious over the sweeping, Robert superintending, keeping just in front of the broom, hopping straight into the dust-pan, bristling his feathers when reproved, or flying, in frigid terror, if pursued. They helped also in preparing the meals, following from kitchen to pantry, from pantry to kitchen, till a too generous attendance was checked for the time by compulsory return to the cage.

Ignorant of all fear they became my constant companions from room to room, from house to garden and orchard, when wild birds looked down in wonder, coming from the higher branches to peer and question, Peepsy answering politely, fluttering the brown velvet wings in unavailing winningness, while Robert silently ignored their inquisitive ways. During the intense heat of midsummer I saw less of the twins than usual, the house being darkened as much as possible to exclude the heat. Opening my door I heard the patter of little feet as they crossed the hall; Peepsy stood upon the threshold and, with a welcoming chirp, flew towards me, coaxing and nestling against my cheek with many evidences of gladness.

The heat of the day was waning; the sun had withdrawn from the valley; the heights were radiant still, the peaks of the mountain range dazzlingly lit with golden light. I carried the bird out-of-doors and across the way where children were playing, the tiny guest enjoying the call thoroughly, lunching upon raspberries, exploring the rooms, "trying on" each nook and corner, and regarding with astonished interest a huge feather duster that lay upon the carpet.

Advancing and retreating before the huge monster, ruffling his feathers in rage, he hopped around it several times before his courage was equal to an attack. Then, with wide-spread wings he charged upon the savage enemy, striking it with his beak, trampling upon and biting the feathers.

When we returned Robert's indigna-

tion knew no bounds; he was furious.

He might have been jealous that Peepsy went abroad while he stayed at home; anyway, he pounced upon his brother in angry passion, caught his foot and jerked him off the perch, pulled out his feathers and tumbled him over upon the floor, when I interfered promptly.

As it was past their bedtime I saw them safely asleep, both little heads laid snugly against their wings, and thought by morning the quarrel would be forgotten. When I saw them next poor little Peepsy lay dead upon the cage floor. I strongly suspect that Robert rose early to help him out of the world; at least there was no appearance of suicide!

The remaining twin sang freely for a few hours; he had vanquished an imaginary foe and was singing the song of him who overcometh.

After that he seemed preyed upon by remorse, nor was he ever himself again, refusing food and pining away gradually through the few remaining weeks of his short life, when, in spite of all his faults, he died, as the story-books say, much loved and lamented.

THE COWBIRD.

(*Molothrus ater.*)

C. C. M.

"BUFFALO-BIRD" was formerly one of the names applied to this bird of strange habits, and Major Bendire, who was long an observer of all that took place on the plains, states that one will rarely see a bunch of cattle without an attending flock of cowbirds, who perch on their backs searching for parasites, or sit with "lazy ease," their familiarity with the cattle suggesting their name of cowbird. They also follow the freshly plowed furrows and pick up worms and larvæ. Mr. P. M. Silloway, who has made a very extended and careful study of the cowbird, says that its strange behavior and stealthy movements at certain seasons have prevented the acquisition of full data concerning many features of its life, and a few unfounded speculations about its habits have become current. It occupies a parallel place with the European cuckoo. It never builds a nest, but deposits its eggs in the homes of other birds, usually those of the smaller species. It is, therefore, a homeless creature, and its young are all orphans or adopted children. "It is, indeed, a peculiar bird, having no attractiveness of color, no beauty of voice, and no home. No wonder that, when in the haunts of other species, it hides and skulks as it seeks a suitable and convenient habitation to house its unborn orphan." Major Bendire gives a list of ninety-one birds in whose nests she has been known to leave her eggs. This includes woodpeckers, flycatchers, orioles, thrushes, sparrows, vireos, wrens, and warblers, but the most frequently imposed upon are so small that the cowbird's big nestling is almost certain to be the one to survive, the smaller birds being crowded out, and left to perish. It is said that as many as seven cowbird eggs have been found in a single nest, but there is generally only one. It is believed that a brood of insectivorous and useful birds is almost invariably sacrificed for every cowbird raised. Mr. Ridgway, in his fascinating book on the birds of Illinois, gives the following vivid picture of the female searching for a nest in which to deposit her egg: "She hunts stealthily through the woods, usually among the

FROM COL. F. NUSSBAUMER & SON.
W. MUMFORD, PUBLISHER, CHICAGO.

COW BIRD.
½ Life-size.

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undergrowth, and when a nest is discovered, patiently awaits from a convenient hiding-place the temporary absence of the parent, when the nest is stealthily and hastily inspected, and if found suitable, she takes possession and deposits her egg, when she departs as quietly as she came." "In the village of Farmington, Conn.," says Florence A. Merriam, "we once saw a song sparrow on a lawn feeding a cowbird bigger than she. When she handed it a worm, one of my field class exclaimed in astonishment, 'I thought the big bird was the mother!'"

Some of the foster parents abandon their nests, or build a second nest over the eggs, but usually the little bird works faithfully to bring up the foundling. Sometimes the egg is recognized by the mother and quickly thrown out. Frequently, also, the cowbird will eject one or more eggs of the owner to make room for her egg, or to deceive the owner and leave the same number of eggs as were in the nest before her visit. Sometimes an egg of the owner is found on the ground near a nest containing an egg of the cowbird, and it is no unusual occurrence to find an egg of the cowbird lying near a nest of a species regularly imposed upon by the parasite. Silloway says that the wood thrush, towhee, field and chipping sparrows, yellow-breasted chat, and the Maryland yellow-throat are oftenest selected to bear the burden of rearing the young of the cowbird.

In their courtship the males are very gallant. They arrive from the south several days in advance of the females. At this season—about the middle of March—they generally associate in groups of six or eight, and the males are easily distinguished by the gloss of their black plumage in contrast to the dull brown of the female. They do not pair, the females meeting the advances of the males indiscriminately. Dr. Gibbs, however, thinks that the birds may pair frequently for the summer, and suggests this as reasonable, referring to an incident coming under his notice when he saw a blue jay, on the point of despoiling the nest of a vireo, driven away by a pair of cowbirds in a most valiant manner. In going to the nest he found a large overgrown cowbird occupying the largest share of the structure, "while a poor little red-eyed vireo occupied a small space at the bottom, and beneath his big foster brother."

The eggs of the cowbird hatch in eleven or twelve days. They average .88 by .65 of an inch, the length varying from .95 to .67 of an inch, and the width varying from .72 to .58 of an inch. The ground is a dingy white or gray, and the markings vary through all the shades of brown, sometimes evenly distributed over the surface, and at other times predominating around the larger end. There is so much diversity in the appearance of different specimens, that frequently the investigator is puzzled in distinguishing the true eggs of the towhee, cardinal, and other species from those of the cowbird.

In the breeding season the male grackles, red-winged blackbirds, and the cowbirds of both sexes, nightly congregate to roost together. Early after the breeding season they form into flocks of from fifty to sixty. The birds have then finished moulting, and the glossy black of the males has been changed into the duller colors of the females and the young. They assemble with the blackbirds of various species where food is most abundant and easy to be procured.

Late investigations of the food habits of the cowbird indicate that the species is largely beneficial. Prof. Beal showed the food of the cowbird to consist of animal and vegetable matter in the proportion of about twenty-eight per cent. of the latter. Spiders and harmful insects compose almost exclusively the animal food, while weed seeds, waste grain, and a few miscellaneous articles make up the vegetable food. Mr. Silloway thinks "it is not improbable that the so-called insectivorous birds displaced by the cowbird are thus kept in check by this natural agent, and their mission performed by the usurper in directions as helpful as the special functions of the sufferers. We may later come to understand that one cowbird is worth two bobolinks after all."

THE LEGEND OF SAINT SILVERUS.

There runs an old, old legend,
A tale of Christmas time,
Low breathed round the fireside
In distant Northern clime;
It tells how once an angel
Looked down in mercy sweet,
And bade the people listen
To hear the Master's feet:
"Behold the Christ-child cometh!
The King of love is near!
Oh! bring your gifts of Noel
Unto the Lord most dear."

With golden grain of plenty
Fair shone each raptured home;
The corn crown'd every dwelling
Whereto the Christ should come.
And one, a blue-eyed stripling,
In longing all unknown,
With heart aflame had labored
For gift that God might own:
"Behold the Christ-child cometh!"
Up rose the music blest,
And Silverus stood waiting
With sheaf the richest, blest.

A tiny bird, nigh fainting,
A little trembling thing,
Through chilling airs of Christmas
Drew near on drooping wing;
The people raised a clamor,
They chased it from the corn,
They drove it from the garlands
That gleamed for Christmas morn:
"Behold the Christ-child cometh!"
His praise they fain would win;
How could they bring to Jesus
An offering marred and thin?

On drooping, dying pinion
That vainly sought relief,
The shivering bird down lighted
Where shone the proudest sheaf;
And Silverus moved softly,
Though dews all wistful stirred,
Close, close within his bosom
He fed the fainting bird:
"Behold the Christ-child neareth!"
He spake in faltering tone,
"The golden ears are broken,
Yet broken for His own."

And while the sheaf of beauty
Grew marred and spent and bare,
The sweet bird flew to heaven;
The King of love stood there:
"Oh! tender heart and Christlike,
Whose yearnings soared on high,
Yet could not see, uncaring,
My weakest creature die!
Lo, I am with thee always,
My Christmas light is thine;
The dearest gift of Noel
Is pity poured for mine!"

BIRDS GATHERED HIS ALMOND CROP.

AN ALMOND-GROWER of this locality hit upon a neat device for gathering his crop last fall. His trees bore largely, and this early became known to the yellowhammers, a species of the woodpecker tribe of birds, and they had regularly stored away large quantities of ripe nuts taken from the orchard in the limb of an oak tree near by. The astute orchardist watched operations, and at last hit upon a novel nut and labor-saving plan, and he lost no time in putting it into execution.

The limb was sawed from the tree and replaced by a square-shaped funnel, long enough nearly to reach the ground; a bucket was then set underneath. A genuine robbing game then went merrily on. The birds gathered the nuts, which they dropped into the funnel and down into the bucket below, and as regularly as night came the almond-grower would in his turn empty it of its contents and set it back for a new supply. This was kept up until the entire crop had been gathered and the yellowhammers had departed broken-hearted at the heartless deception practiced upon them.—*Sutler (Cal.) Enterprise.*

STORIES FROM BIRDLAND.

A SPECIMEN of the egg of that rara avis, the great auk, which was discovered after twenty-seven years in a disused attic in the house of Lord Garvagh in England, recalls to mind the fact that only about seventy of these zoölogical treasures are now known to exist. Of these G. F. Rowley of Brighton possesses half a dozen, while Prof. Alfred Newton of Cambridge, the well-known zoölogical expert, has half that number. The same gentleman discovered a splendid set of ten, labeled "penguin eggs," in the Royal College of Surgeons upward of thirty years ago, while the university museum at Cambridge possesses four, which were the gift of the late Lord Lilford, whose beautiful grounds at Oundle were a veritable paradise of bird life. One of these was brought to light in a farmhouse in Dorsetshire, and another changed hands in Edinburgh for a mere trifle. It is a remarkable fact that, whereas in 1830 the market price of a great auk's eggs was no more than $1.25, Lord Garvagh's specimen was bought from Dr. Troughton in 1869 for $320; Sir Vauncey Crewe, in 1894, paid $1,575 for one; in 1897, another was knocked down in London for $1,470, and a slightly cracked specimen went about the same time for $840; not so long ago a couple of these eggs was purchased at a country sale for $19 and resold for $2,284.

Some few years ago a robin took up his abode near the communion table in the old abbey at Bath, England, and remained there for some considerable time; his victualing department being presided over by a friendly verger, he naturally had every inducement to remain, and remain he did. During sermon time, with the exception of an occasional chirp of approval, he preserved an exemplary silence, neither coughing nor yawning, but when the hymns were sung, and he perched himself on the communion rail, his voice could be heard high above those of the human singers. All redbreasts, however, do not behave so well, and one at Ely cathedral some time ago carried on in such a manner that he brought disgrace on his tiny head. During the service he behaved fairly well, but when the clergyman ascended the pulpit and began to speak, the robin deliberately perched himself on an adjacent pinnacle of the chancel screen and began to sing, and the louder the preacher spoke the greater volume of sound proceeded from the irreverent bird, till he had to be removed.

The first place in the ranks of birds was until lately given by naturalists to eagles and hawks. The low-foreheaded tyrants are now dethroned, and the highest development of the race is reached in the family of the sparrows, if the following story be true. A man was feeding with breadcrumbs a wood pigeon at his feet. One of the bird's feathers, which was ruffled and out of place, caught the eye of a sparrow; the little bird flew down, seized the feather in its beak and pulled its best. The feather did not yield at once, and the pigeon walked off with offended dignity. The sparrow followed, still holding on; and, in the end, flew off triumphant with the trophy to its nest.

DECEMBER.

Down swept the chill wind from the mountain peak,
From the snow five thousand summers old;
On open wold and hill-top bleak
It had gathered all the cold,
And whirled it like sleet on the wanderer's cheek;
It carried a shiver everywhere
From the unleafed boughs and pastures bare;
The little brook heard it and built a roof
'Neath which he could house him, winter-proof;
All night by the white stars' frosty gleams
He groined his arches and matched his beams;
Slender and clear were his crystal spars
As the lashes of light that trim the stars;
He sculptured every summer delight
In his halls and chambers out of sight.
. . . . . .
'Twas as if every image that mirrored lay
In his depths serene through the summer day,
Each fleeting shadow of earth and sky,
Lest the happy model should be lost,
Had been mimicked in fairy masonry
By the elfin builders of the frost.

—*Lowell.*

THE WILD CAT.

(*Lynx rufus.*)

C. C. M.

THE species of lynx found in forests in the United States is the red or bay lynx. Its popular name is wild cat, but it is a true lynx, with the ear tufts characteristic of that group, and differs from the other members of it principally in the color of its fur. It is a resident of every part of the United States from ocean to ocean. The general color is usually red, but darker, and sometimes nearly black along the backbone, while under the body it is whitish and on the breast pure white. The entire fur, except the breast, is covered with spots and streaks of darker fur. The length of the body and head is about fifty-three inches and the tail is six inches long. The color of the fur is of a brighter red in summer and a darker brownish-red in winter. Different writers have classified several species of the American lynx, including the Texas lynx, which is found in Texas, and southern California; the Oregon lynx, which inhabits northern Oregon and Washington. There is also a Florida lynx. It is believed there is not much justification for these divisions, which Brehm says are based principally upon the different markings of the fur, and that in a general way it may be said that the specimens obtained from southern climates have shorter fur, which is more brightly colored and more distinctly spotted than those from the northern regions; but otherwise these animals do not differ in their habits and characteristics, which are those of the lynx group in general.

The natural home of the wild cat is a dense forest abounding in deep thickets and game. It rarely seeks sparsely-wooded sections. Sometimes it will hunt the hare even on the plain, and a prairie fire will drive it to the neighborhood of settlements. It is capable of great endurance in walking, can leap an astonishing distance, climbs well, and is said to be a good swimmer. Its sense of hearing is very acute, and its sight keen. It is a night-prowler, hiding at the dawn of day, and remaining still until evening. The wild cat selects for its lair a deep thicket, a cavern, or hole in a tree trunk.

As the shades of evening fall, says Brehm, it becomes active. During the day it seems as rigid as a statue, but at night it sets out, and on the first part of its journey makes frequent pauses, like those made by the domestic cat previous to entering an enclosure that appears to threaten danger. Only a very inexperienced person could mistake the spoor of the lynx for that of any other animal. The imprint is very deep owing to the strength of the paw, which exceeds that of a large wolf. It is very round and, as the claws are hidden, it is blunt in front. The pace is short compared with the size of the imprints made. The spoor takes a form something like that of a row of pearls; any one who has once seen it is sure to recognize it again.

The wild cat seems clumsy; its body is heavy, but it possesses the agility of its kind and surpasses them in rapidity of movement and endurance. Almost all animals and birds are its prey, although only the strongest lynx will attack deer. In temperate climates it is detested by the farmer and sportsman as it kills more than it needs, for its sustenance, often merely lapping the blood of its victim, and eating only the choicest portions. In the south it will not return a second time to this food, but in the north, where game is scarce, it always returns, remaining near the carcass until it is all eaten.

The wild cat has been tamed but it has not been found to be a very attractive animal to handle when angry. Loewis gives the following report of a

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WILD CAT.

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female that he kept. He says: "A few months sufficed to teach my young lynx her name, 'Lucy.' When, during a hunting expedition, I would call out this name, together with those of numerous dogs, she would always respond to her own name, but to no other. Her training had been very easy and had reached such a point that when she was engaged in a passionate, but forbidden chase of hares, sheep, or poultry, and I called her, she would stop instantly and return, like a guilty dog, crouching low on the ground and pleading for mercy. When she was too far away to hear our voices, the report of a gun was sufficient to call her back in breathless haste. Lucy took part in all my autumnal hunting-trips. When she got sight of a poor hare she at once engaged in hot pursuit, and, in spite of her great excitement, she always had enough reasoning power to gauge the distance and to approximate the difference between the hare's speed and her own. She would obey only my brother's and my own summons, and showed no respect to any other persons. When we were both absent for a whole day, nobody could control her, and then, woe be unto the careless chicken or the thoughtless goose! During our absence she would, as soon as it became dusk, climb on the roof, lean against the chimney, and go to sleep. As soon as our carriage came into the yard, late at night, she sprang to the stairs in a few bounds. If I then called her name she would come to me quickly, put her strong fore-paws on my shoulders and, purring and rubbing herself against me, she would follow me into the room and prepare to pass the night on the bed or the lounge."

The fur of the lynx is very valuable. The Scandinavian specimens are counted among the largest and finest. Siberia and Russia furnish many thousands of skins. The flesh is said to be very palatable. It is light colored and tender, like the best veal, and is free from the disagreeable taste so common in game. The lynx was known to the ancients but was exhibited much more rarely in Rome than the lion and leopard, because even then it was so much more difficult to take alive. The one that Pompey exhibited had been captured in Gaul. The life of the wildcat in the natural state was shrouded in mystery which left room for many fables.

CHRISTMAS ONCE IS CHRISTMAS STILL.

PHILLIPS BROOKS.

The silent skies are full of speech,
  For who hath ears to hear;
The winds are whispering each to each;
The moon is calling to the beach;
And stars their sacred wisdom teach
  Of Faith and Love and Fear.

But once the sky its silence broke,
  And song o'erflowed the earth;
The midnight air with glory shook,
And angels mortal language spoke,
When God our human nature took
  In Christ the Savior's birth.

And Christmas once is Christmas still;
  The gates through which He came,
And forests wild, and murmuring rill,
And fruitful field, and breezy hill,
And all that else the wide world fill,
  Are vocal with His name.

Shall we not listen while they sing
  This latest Christmas morn,
And music hear in everything,
And faithful lives in tribute bring,
To the great song which greets the King
  Who comes when Christ is born?

THE EUROPEAN SQUIRREL.

(*Sciurus vulgaris.*)

C. C. M.

THIS is regarded as the typical species among the tree squirrels, and its character and that of the common species of American squirrels are very similar. The attitudes of the animals are familiar to all who have watched the antics of squirrels in their arboreal homes. It is widely distributed throughout all of Europe and across the Caucasus and Ural through southern Siberia to the Altai and eastern Asia. Brehm says it is not equally common everywhere or every year. Its favorite haunts are dry, shady forests with high trees and it is as much averse to dampness as to sunshine. When fruit and nuts are ripe it visits the gardens of villages, but only when they are connected with the forest by small tracts of trees or bushes. It will not attempt to forage far from the protection of the trees. Where there are many pine cones the squirrel makes its permanent home, and builds one or several habitations, usually in old crows' nests, which it improves very ingeniously. If it intends to make only a short stay, it uses the forsaken nests of magpies, crows, or birds of prey, just as it finds them, but the nests which it intends to serve as a permanent sleeping-place, a shelter against bad weather or a nursery, are built new, though the materials collected by birds are often utilized. It is said that every squirrel has at least four nests, though nothing has been definitely proven as to this. Hollows in trees, especially hollow trunks, are also frequented by them and occasionally built in. The open-air nests usually lie in a fork, close to the main trunk of the tree; the bottom is built like one of the larger bird's nests, while above there is a flat conical roof, after the manner of magpies' nests, close enough to constitute a perfect protection from the rain. The main entrance is placed sideways, usually facing east; a slightly smaller loop-hole for escape is found close to the trunk. Moss forms a soft lining inside. The outer part consists of twigs of various thicknesses, intertwined. Brehm says this squirrel especially likes to use the firm bottom of a forsaken crow's nest, filled with earth and clay, as a base upon which to construct a nest of its own.

A famous naturalist, describing this little creature, says that it is one of the principal ornaments of a forest. In quiet, fine weather it is incessantly active, keeping as much as possible to the trees, which at all times afford it food and cover. Occasionally it will deliberately descend a tree, run to another tree and climb that; doing this often in pure playfulness; for it need not touch the ground at all, unless it wishes to do so. He calls it the monkey of the woods of temperate climes, and it is possessed of many attributes which remind one of that capricious inhabitant of the warmer zone. There are probably few mammals which are possessed of such constant briskness and remain for so short a time in the same place as the squirrel does in tolerably fair weather. It is ever going from tree to tree, from top to top, from branch to branch; and even on the ground it is anything but clumsy or out of place. It never walks or trots, but always proceeds in longer or shorter bounds, and so quickly that a dog can hardly overtake it, and a human being has to give up the pursuit after a short time. "It glides up even the smoothest trees with wonderful ease and speed. The long, sharp claws on the toes stand it in good stead, for it hooks them into the bark, all four feet at once. Then it takes a running start for another leap and darts further upward; but one bound succeeds another with such rapidity that the ascent proceeds uninterruptedly, and looks as if the creature glided up the tree. Usually it ascends to the top of the tree without pausing, not infrequently reaching the highest

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EUROPEAN SQUIRREL
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point; then it goes out on one of the horizontal branches and generally jumps to the tip of a branch of another tree, covering in these jumps distances of four or five yards, always in a downward direction. How necessary the bushy tail is for leaping has been demonstrated by cruel experiments, which consisted in cutting off the tail of some captive squirrel. It was then seen that the mutilated creature could not leap half so far as one having a tail. The squirrel is an excellent swimmer, though it does not go into the water willingly."

The squirrel eats fruit or seeds, buds, twigs, shells, berries, grain, and mushrooms. The seeds, buds, and young shoots of fir and pine trees form its principal food. It bites pine cones off at the stem, comfortably sits down on its haunches, lifts the cone to its mouth with its forepaws, and turning it constantly around, it bites off one little scale after another with its sharp teeth, until the kernel is reached, which it takes out with its tongue. Hazel nuts are a favorite dainty with it. Bitter kernels, like almonds, for instance, are poison to it; two bitter almonds are sufficient to kill it.

When food is abundant the squirrel lays by stores for less plenteous times. In the forests of southeastern Siberia it stores away mushrooms. "They are so unselfish," says Radde, "that they do not think of hiding their supply of mushrooms, but pin them on the pine needles or in larch woods on the small twigs. There they leave the mushrooms to dry, and in times of scarcity of food these stores are of good service to some roaming individual of their kind."

Four weeks after the breeding-season the female gives birth to from three to seven young, in the softest, best located nest; the little ones remain blind for nine days and are tenderly nurtured by the mother. After they have been weaned the parents leave the young to their fate. They remain together for a while, play with each other and soon acquire the habits of their parents. By June it is said the female has another family, and when they also are so far grown up that they can roam around with her, she frequently joins her first litter, and one may see the entire band, sometimes consisting of from twelve to sixteen members, gamboling about in the same part of a wood.

The squirrel is a very cleanly animal, licking and dressing its fur unceasingly.

The finest squirrel skins come from Siberia, and the farther east they are procured the darker and more valuable they are. The back and under part of the furs are used separately. Russia and Siberia annually furnish from six to seven million skins, valued at about one million dollars. Most of these skins are manufactured in Russia and exported to China. Besides the skins, the tails are employed as boas, and the hair of the tail makes good painters' brushes. The flesh is white, tender, and savory, and is much esteemed by epicures.

"IN ORDERS GRAY."

E. F. MOSBY.

VERY demure is the soft gray of the catbird's garb, but under it is hidden a spirit ever ready for frolic and fun. His liquid, shining eyes are very innocent, yet they are full of mischief. He always looks to me as if he had a secret—one, however, that he is willing to share with any friendly looker-on. Not even the chat takes a more genuine delight in sport. Hide-and-seek is a favorite game with the whole tribe, and in their shadowy gray, how they glide through the branches and lurk in the thick

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BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

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JANUARY.

Then came old January, wrapped well
In many weeds to keep the cold away;
Yet did he quake and quiver like to quell,
And blow his nayles to warm them if he may;
For they were numb'd with holding all the day
An hatchet keene, with which he felled wood,
And from the trees did lop the needlesse spray;
Upon a huge great earth-pot steane he stood,
From whose wide mouth there flowed forth the Romane flood.

—*Spenser.*

Announced by all the trumpets of the sky,
Arrives the snow; and, driving o'er the fields,
Seems nowhere to alight; the whited air
Hides hills and woods, the river, and the heaven,
And veils the farm-house at the garden's end.
The sled and traveler stopp'd, the courier's feet
Delay'd, all friends shut out, the housemates sit
Around the radiant fire-place, inclosed
In a tumultuous privacy of storm

—*Emerson.*

OLD YEAR AND YOUNG YEAR.

I.

Said the year that was old:
"I am cold, I am cold,
And my breath hurries fast
On the wild winter blast
Of this thankless December;
Ah, who will remember
As I, shivering, go,
The warmth and the glow
That arose like a flame
When I came, when I came?
For I brought in my hands,
From Utopian lands,
Golden gifts, and the schemes
That were fairer than dreams.
Ah, never a king
Of a twelvemonth, will bring
Such a splendor of treasure
Without stint or measure,
As I brought on that day,
Triumphant and gay.
But, alas, and alas,
Who will think as I pass,
I was once gay and bold?"
Said the year that was old.

II.

Said the year that was young—
And his light laughter rung—
"Come, bid me good cheer,
For I bring with me here
Such gifts as the earth
Never saw till my birth;
All the largess of life,
Right royally rife
With the plans and the schemes
Of the world's highest dreams.
Then—hope's chalice filled up
To the brim of the cup,
Let us drink to the past,
The poor pitiful past,"
Sang the year that was young,
While his light laughter rung.

—*Nora Perry.*

THE VIRGINIA RAIL.

(*Rallus virginianus.*)

THIS miniature of *Rallus elegans* or king rail, is found throughout the whole of temperate North America as far as the British Provinces, south to Guatema a and Cuba, and winters almost to the northern limit of its range. A specimen was sent by Major Bendire to the National Museum from Walla Walla, Wash., which was taken Jan. 16, 1879, when the snow was more than a foot deep. Other names of the species are: Lesser clapper rail, little red rail, and fresh-water mud hen. The male and female are like small king rails, are streaked with dark-brown and yellowish olive above, have reddish chestnut wing coverts, are plain brown on top of head and back of neck, have a white eyebrow, white throat, breast and sides bright rufous; the flanks, wing linings and under tail coverts are broadly barred with dark brown and white; eyes red.

The name of this rail is not as appropriate to-day as it was when Virginia included nearly all of the territory east of the Mississippi. It is not a local bird, but nests from New York, Ohio, and Illinois northward. Short of wing, with a feeble, fluttering flight when flushed from the marsh, into which it quickly drops again, as if incapable of going farther, it is said this small bird can nevertheless migrate immense distances. One small straggler from a flock going southward, according to Neltje Blanchan, fell exhausted on the deck of a vessel off the Long Island coast nearly a hundred miles at sea.

The rail frequents marshes and boggy swamps. The nest is built in a tuft of weeds or grasses close to the water, is compact and slightly hollowed. The eggs are cream or buff, sparsely spotted with reddish-brown and obscure lilac, from 1.20 to 1.28 inches long to .90 to .93 broad. The number in a set varies from six to twelve. The eggs are hatched in June.

The Virginia rail is almost exclusively a fresh-water bird. It is not averse to salt water, but even near the sea it is likely to find out those spots in the bay where fresh-water springs bubble up rather than the brackish. These springs particularly abound in Hempstead and Great South Bay on the south coast of Long Island. Brewster says the voice of the Virginia rail, when heard at a distance of only a few yards, has a vibrating, almost unearthly quality, and seems to issue from the ground directly beneath the feet. The female, when anxious about her eggs or young, calls *ki ki-ki* in low tones and *kiu*, much like a flicker. The young of both sexes in autumn give, when startled, a short, explosive *kep* or *kik*, closely similar to that of the Carolina rail.

There is said to be more of individual variation in this species than in any of the larger, scarcely two examples being closely alike. The chin and throat may be distinctly white, or the cinnamon may extend forward entirely to the bill. This species is found in almost any place where it can find suitable food. Nelson says: "I have often flushed it in thickets when looking for woodcock, as well as from the midst of large marshes. It arrives the first of May and departs in October; nests along the borders of prairie sloughs and marshes, depositing from eight to fourteen eggs. The nest may often be discovered at a distance by the appearance of the surrounding grass, the blades of which are in many cases interwoven over the nest, apparently to shield the bird from the fierce rays of the sun, which are felt with redoubled force on the marshes. The nests are sometimes built on a solitary tussock of grass, growing in the water, but not often. The usual position is in the soft, dense grass growing close to the edge of the slough, and rarely in grass over eight inches high. The nest is a thick, matted platform of marsh grasses, with a medium-sized depression for the eggs."

Some of the rails have such poor wings that it has been believed by some unthinking people that they turn to frogs in the fall instead of migrating—a theory parallel with that which formerly held that swallows hibernate in the mud of shallow ponds.

NCE, MASS.

NOM COL. F KAEMPFER.
. MUMFORD, PUBLISHER, CHICAGO.

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VIRGINIA RAIL.
⅝ Life-size.

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COTTON FABRICS.

W. E. WATT, A.M.

IT is a remarkable thing in the history of the United States that, when the iron shackles were about to fall from the bondman, he was caught by a cotton fiber and held for nearly a century longer. We were about to emancipate the slaves a century ago when Eli Whitney invented the cotton gin, multiplied cotton production by two hundred, and made slavery profitable throughout the South. The South Carolina legislature gave Whitney $50,000 and cotton became king and controlled our commerce and politics.

Eight bags of cotton went out of Charleston for Liverpool in 1784. Now about six million bales go annually, and we keep three million bales for our own use. So two-thirds of our cotton goes to England. The cotton we ship sells for more than all our flour. Cotton is still king.

In our civil war we came very near being thrown into conflict with England by an entanglement of the same fiber which caught the black man. One of the greatest industries of England in 1861-5 was cotton manufacture, and when we, by our blockade system, closed the southern ports so cotton could not be carried out, we nearly shut down all the works in that country where cotton was made up. That meant hard times to many towns and suffering to many families. That is why so many Englishmen said we ought to be satisfied to cut our country in two and let the people of the Confederacy have their way.

Cotton is a world-wide product. It grows in all warm countries everywhere, sometimes as a tree and sometimes as a shrub. It is usually spoken of as a plant. There was cotton grown in Chicago last year. Not in a hot house, but in a back yard with very little attention. A little girl got some seed, planted it, and had some fine bolls in the fall. It is a pretty plant, and was cultivated in China nearly a thousand years ago as a garden plant.

Herodotus tells us that the clothing worn by the men in Xerxes' army was made of cotton. Their cotton goods attracted wide attention wherever they marched. Columbus found the natives of the West Indies clothed in cotton. Cotton goods is not only wide spread, but very ancient. Cloth was made from this plant in China twenty-one hundred years ago. At the coronation of the emperor, 502 A.D., the robe of state which he wore was made of cotton, and all China wondered at the glory of his apparel.

More capital is used and more labor employed in the manufacture and distribution of cotton than of any other manufactured product. There is one industry in Chicago which out-ranks cotton. It is the live-stock business. More money is spent for meat and live-stock products than for cotton, taking the whole country together. But cotton ranks first as a manufacture.

We spend more for meat than for cotton goods, and more for cotton goods than for wheat and flour. The hog and cotton seed have a peculiar commercial relation to each other. The oils produced from them are so nearly alike that lard makers use cotton seed oil to cheapen their output. A large part of what is sold as pure leaf lard comes from the cotton plant.

A hundred years ago a good spinner used to make four miles of thread in a day. This was cut into eight skeins. Now one man can do the work of a thousand spinners because of machinery. One gin does to-day what it took a thousand workers to do then. Five men are employed in the running of one gin, so the gin alone makes one man equal to two hundred. Because one workman cleans two hundred times as much cotton since Whitney's time as before, cotton-raising has become a broad industry. The reason more cotton was not raised in the olden times is that it could not be used. Now we can use as much cotton as we can possibly raise.

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because the workmen felt their occupation would be taken away. But the cotton workers are to be congratulated, for there are four times as many men working in the cotton industries as there were a hundred years ago, and yarn thread is produced at less than one-tenth the cost while the workmen are all better paid for their labor.

James Hargreaves invented the spinning jenny in 1767. He was an illiterate man, and yet his machinery has not been materially improved upon. The poor fellow was mobbed by the infuriated workmen who saw that their labor was apparently to be taken from them by machinery. He was nearly killed. He sold out his invention and died in poverty. He received nothing from the government nor from the business world for his great invention. But after his death his daughter received a bounty.

Two years after the jenny, in 1769, Richard Arkwright invented the spinning frame. He was a barber by trade, but through the appreciation of crazy old George III., he was struck upon the shoulder with a sword and rose Sir Richard Arkwright. He amassed a great fortune from his invention. His spinning frame and Hargreaves' spinning jenny each needed the other to perfect its work. The jenny made yarn which was not smooth and hard. So it was used only for woof, and could not be stretched for warping. The result of the two inventions was a strong, even thread which was better for all purposes than any which had been made before.

Parliament imposed a fine of $2,500 for sending American cotton cloth to England, and another for exporting machinery to America. Massachusetts at once gave a bonus of $2,500, and afterwards $10,000 to encourage the introduction of cotton machinery. Francis Cabot Lowell was an American inventor. He brought the business of weaving cotton cloth to this country. There had been some small attempts before his time, but he introduced it extensively and profitably. He established a cotton factory in Massachusetts in 1810, and was very successful. In that year he was in England, dealing with makers of cotton goods. The idea occurred to him that it would be more profitable to make the goods on his side of the water where the cotton was raised. He acted promptly. Lowell, Massachusetts, is named after him, and stands as a monument to his good judgment and inventive genius.

Three years after he had established the manufacture of cotton goods in this country, he invented the famous power loom. That was a great step in advance. It has done more for the industry than anything since the days of Hargreaves and Arkwright. By the use of power these looms set the spindles running at a remarkable rate of speed. Twenty years ago the world wondered at the velocity of our spindles, 5,000 revolutions in one minute. But it has kept on wondering ever since, and the speed of spindles has constantly increased as if there could be no limit. 15,000 revolutions are now common.

In Great Britain there are 45,000,000 spindles running at a wondrous rate, and 17,000,000 are running in America. With cheaper labor and more extended experience, they are doing more of it across the water than we. For our consumption we make all the coarse grades, but all the fine cottons are imported. They get large quantities of cotton now in India. Egypt also is a great cotton country, producing the best cotton grown with the one exception of our famous sea island cotton. Her crop is worth $48,000,000 annually. England has hunted the world over for cotton and good cotton ground, and while we were engaged in war she was increasing her endeavors in this direction with much earnestness.

If you will notice the contents of a boll of cotton you will be surprised to find that the fiber is not the main thing there. The seed is far heavier than the fiber, and it really occupies more space when the two are crowded into their closest possible limits. You can press the cotton down upon the seed till the whole is but little larger than the seed.

The fiber clings to the seed with great firmness, and you find it difficult to tear them from each other. There

is no wonder it was such a slow process to separate them in the good old days. The Yankee, Eli Whitney, went to Georgia to teach school, but by the time he arrived there the school was taken by another, and he was out of employment. That was a happy misfortune for him and for the country.

He was a nailer, a cane maker, and a worker in wood and metal. A Yankee nailer cannot be idle in a strange land. The expression, "as busy as a nailer," is a good one. Whitney looked about him to see what was the popular demand in his line. He found the greatest difficulty the southern people had to contend with was the separating of cotton from its seed. He went at the business of inventing a machine to do the work for them.

He placed a saw in a slit in a table so that cotton could be pushed against its teeth as it revolved. The teeth caught into the fiber and pulled it away from the seeds. As the seeds were too large to pass through the slit in the table they flew away as the fiber let go its hold upon them, and Whitney soon found he had solved the problem.

This is the first step in what may be called the manufacture of cotton fabrics. In another article we shall examine all the various sorts of textiles that are made from this interesting fiber, and speak of their manufacture, treatment, sale, and use.

Under Whitney's gin the bulky seeds soon began to pile up astonishingly, and it became customary to remove the gins as the piles of this useless seed accumulated. It was left to rot upon the ground in these heaps just as it fell from the gin. Another ingenious Yankee saw there was a great deal of material going to waste in these piles, and he experimented to see what could be done with the seed.

It was found to be very good for use on ground that had become poor by exhaustive farming. An excellent fertilizer is made from it. The cake is used for feed for cattle to great advantage. Dairymen regulate the quality and color of the milk they get from their cows by varying the amount of oil cake given in their food. The oil extracted from this seed is used in the arts. It is not equal to linseed oil for painters' use, but it is a great substance for use in mixing in with better oils to make them go farther. In other words, it is largely used for the purposes of adulterating other oils. Not only is it used in making lard, but it is now sold on its own merits for cooking purposes.

Two days out of New York we sighted the black smoke of a great steamer. At sea everybody is on the lookout for vessels and much interested in the passengers that may be on the craft casually met. So we kept watch of the horizon and were glad to see that a big one was coming our way. She was headed so nearly towards us that we hoped to get a good view of the many passengers that might be expected on so large a ship. When she was near enough to show some of her side, she looked rusty and ill kept. We wondered what the fare must be for a ride across the water on such a cheap-looking monster. As she came nearer we saw there were no passengers. "What is she?" "What does she carry?" The first mate told us she was a tank steamer, running between the United States and Belgium, carrying 4,200 tons of cotton-seed oil at a trip.

THE WISE LITTLE BIRD.

A little cock sparrow sat on a limb
And shivered and shook and whined;
And his little mate went and sat by him
And asked what was on his mind.

"The snow comes down and the north wind blows,"
The little cock sparrow said.
"And the cold, cold world is so full of woes
That I wish that I were dead."

So his little mate chirped, "Come, fly with me,"
And they left that frosty limb,
And they fluttered about from tree to tree,
And she gayly chattered to him.

And the little cock sparrow forgot the snow
And the chilling wind that blew,
Nor thought again of his weight of woe;
He had something else to do.

THE GRASSHOPPER SPIDER.

CHARLES CRISTADORO.

OUT in the garden where the western sun flooded the nasturtiums along the garden wall, a large yellow and black-bodied spider made his lair. The driving rain of the night before had so torn and disarranged his web that he had set about building himself a new one lower down. Already he had spun and placed the spokes or bars of his gigantic web and was now making the circles to complete his geometric diagram.

From his tail he exuded a white, sticky substance, which, when stretched, instantly became dry. As he stepped from one spoke to another he would spin out his web and, stretching the spoke towards the preceding one, bring the fresh-spun web in contact with it and then exude upon the jointure an atom of fresh web, which immediately cemented the two parts, when the spoke settled back into place, pulling the cross web straight and taut. The process of house-building continued uninterruptedly, every movement of the spider producing some result. No useless steps were taken, and as the work progressed the uniformity of the work was simply amazing: every square, every cross piece, was placed exactly in the same relative position as to distance, etc. A micrometer seemingly would not have shown the deviation of .000001 of an inch between any two of the squares.

When the web was three-fourths finished a lusty grasshopper went blundering up against one of the yet uncovered spokes of the web and escaped. The spider noticed this and visibly increased his efforts and sped from spoke to spoke, trailing his never ending film of silky web behind him. At last the trap was set and, hastening to the center, he quickly covered the point with web after web, until he had a smooth, solid floor with an opening that allowed the tenant to occupy either side of the house at will. The spot was well selected, the hoppers in the heat of the day finding the heavy shade of the broad nasturtium leaves particularly grateful.

Our friend the spider had not long to wait for his breakfast, for presto!—a great, brown-winged hopper flew right into the net. Before he could, with his strong wings and powerful legs, tear the silken gossamer asunder and free himself, like lightning our spider was upon him. In the flash of an eye the grasshopper was actually enshrouded in a sheet of white film of web, and with the utmost rapidity was rolled over and over by the spider, which used its long legs with the utmost dexterity. Wound in his graveyard suit of white silk, the grasshopper became absolutely helpless. His broad wings and sinewy legs were now useless. The spider retreated to the center of the web and watched the throes of his prey. By much effort the hopper loosed one leg and was bidding fair to kick the net to shreds when the spider made another sally and, putting a fresh coating of sticky web around him, rolled him over once or twice more and left him.

In a few moments, when all was over, the spider attacked his prey and began his breakfast. Before his meal was well under way, a second hopper flew into the parlor of the spider and, leaving his meal, the agile creature soon had hopper number two securely and safely ensnared. No experienced football tackle ever downed his opponent with any such skill or celerity as the spider displayed as he rolled over and bundled up into a helpless web-covered roll the foolish and careless hopper.

"The spiders touch, how exquisitely fine!
Feels at each thread, and lives along the line."

THE BLUE-WINGED TEAL.

(Anas discors.)

SO many names have been applied to this duck that much confusion exists in the minds of many as to which to distinguish it by. A few of them are blue-winged; white-face, or white-faced teal; summer teal, and *cerceta comun* (Mexico.) It inhabits North America in general, but chiefly the eastern provinces; north to Alaska, south in winter throughout West Indies, Central America, and northern South America as far as Ecuador. It is accidental in Europe.

The blue-winged teal is stated to be probably the most numerous of our smaller ducks, and, though by far the larger number occur only during the migrations, individuals may be found at all times of the year under favorable circumstances of locality and weather. The bulk of the species, says Ridgway, winters in the Gulf states and southward, while the breeding-range is difficult to make out, owing to the fact that it is not gregarious during the nesting-season, but occurs scatteringly in isolated localities where it is most likely to escape observation.

The flight of this duck, according to "Water Birds of North America," is fully as swift as that of the passenger pigeon. "When advancing against a stiff breeze it shows alternately its upper and lower surface. During its flight it utters a soft, lisping note, which it also emits when apprehensive of danger. It swims buoyantly, and when in a flock so closely together that the individuals nearly touch each other. In consequence of this habit hunters are able to make a frightful havoc among these birds on their first appearance in the fall, when they are easily approached. Audubon saw as many as eighty-four killed by a single discharge of a double-barreled gun.

"It may readily be kept in confinement, soon becomes very docile, feeds readily on coarse corn meal, and might easily be domesticated. Prof. Kumlein, however, has made several unsuccessful attempts to raise this duck by placing its eggs under a domestic hen. He informs me that this species is the latest duck to arrive in the spring." It nests on the ground among the reeds and coarse herbage, generally near the water, but its nest has been met with at least half a mile from the nearest water, though always on low land. The nest is merely an accumulation of reeds and rushes lined in the middle with down and feathers. This duck prefers the dryer marshes near streams. The nests are generally well lined with down, and when the female leaves the nest she always covers her eggs with down, and draws the grass, of which the outside of the nest is composed, over the top. Prof. Kumlein does not think that she ever lays more than twelve eggs. These are of a clear ivory white. They range from 1.80 to 1.95 inches in length and 1.25 to 1.35 in breadth.

The male whistles and the female "quacks."

The food of the blue-wing is chiefly vegetable matter, and its flesh is tender and excellent. It may be known by its small size, blue wings, and narrow bill.

Mr. Fred Mather, for many years superintendent of the State Fish Hatchery of Cold Spring Harbor, Long Island, domesticated the mallard and black duck, bred wood ducks, green and blue-winged teal, pin-tails, and other wild fowl. He made a distinction between breeding and domestication. He does not believe that blue-winged teal can be domesticated as the mallard and black duck can, *i. e.*, to be allowed their liberty to go and come like domestic ducks.

The hind toe of this family of ducks is without a flap or lobe, and the front of the foot is furnished with transverse scales, which are the two features of these birds which have led scientists to separate them into a distinct sub-family. They do not dive for their food, but nibble at the aquatic plants they live among; or, with head immersed and tail in air, "probe the bottom of shallow waters for small mollusks, crustaceans, and roots of plants." The bill acts as a sieve.

THE GRAY STUMP.

NELL KIMBERLY MC ELHONE.

"I BEG your pardon, my dear," said Mr. Flicker, "but you are quite mistaken. That is *not* a tree stump."

"Excuse me," said Mrs. Flicker gently, "but I still believe it is."

Now if they had been the sparrows, or the robins, or the red-winged black-birds, they would have gone on chattering and contradicting until they came to using claws and bills, and many feathers would have been shed; but they were the quiet, well-bred Flickers, and so they stopped just here, and once more critically regarded the object in question.

"Whoever heard of a stump, old and gray and moss-covered, appearing in one night?" said Mr. Flicker, after a pause. "I have seen more of the world than you have, my dear, and I do assure you it would take centuries to make a stump like that." Let it be here recorded that in this Mr. Flicker was perfectly correct.

"Well, then," reasoned Mrs. Flicker, "if it is not a stump, *what is it?*"

Mr. Flicker looked very wise. He turned his head first to one side and then the other—flashing his beautiful scarlet crescent in the sunlight. Then he sidled nearer to his wife and darting his head down to her, whispered, "It is a *person.*"

The timid Mrs. Flicker drew back into the nest in horror, and it was some moments before she felt like putting her head out of the door again. In the meantime she had quieted down to the thoughtful little flicker she really was, and had gathered together her reasoning powers. So out came the pretty fawn-colored head and again the argument began.

Though still quivering a little from the fright, Mrs. Flicker said, in the firm tones of conviction, "No, Mr. Flicker, *that* is not a person. Persons move about with awkward motions. Persons make terrible sounds with their bills. Persons have straight, ugly wings without feathers—not made to fly with, but just to carry burdens instead of carrying them in their bills. Persons wear colors that nature disapproves. Persons point things at us that make a horrible sound and sometimes kill. *Persons cannot keep still.* That is not a person."

Mr. Flicker was greatly impressed, and stood like a statue, gazing at what his wife called a gray stump. She went back to ponder the matter over her eggs.

The sprightly little warblers and goldfinches flashed in and out through the bushes that grew thickly together on a small island opposite Mr. Flicker's nest; the orioles called to one another in the orchard back of him; the cat-birds performed their ever-varying tricks in the cherry tree near by; Mr. Water Wagtail came and splashed about on the shore of the creek, and Mr. Kingfisher perched on a stump in the water, watching for a dainty morsel, and still Mr. Flicker sat regarding his new puzzle. He paid no attention to any of his neighbors—but for that matter he seldom did, for the flickers are aristocratic bird-folk, and mingle very little with their kind. But on this day he was particularly oblivious, so greatly occupied was he with the gray stump.

Once or twice he had detected a slight motion on the part of the stump; a rustle, a change of position, a faint sign of life—just enough to make his little bird-heart thump, but not enough to warrant flight in so discreet a bird. But at last there began a quiet bending, bending of the stump; it was very slow, but none the less certain, and Mr. Flicker waited with throbbing heart, till he saw two large, round, glassy eyes pointed full at him, then, with a quick note of warning for his little wife, he rose in the air with a whirr, and the golden wings shimmered away in the sunlight overhead.

Mrs. Flicker peeped cautiously forth,

and, with her unerring bird instinct, sought first of all the gray stump which, alas, was not quite a stump after all, and was indeed the cause of the danger. She saw the terrible instrument still pointed at her husband, and her heart fluttered wildly; but there was no report, and she watched him till she could only see the occasional flash of the gold-lined wings and the white spot on his back; and then behold, the stump was once more a stump, and Mrs. Flicker returned to her eggs.

When Mr. Flicker came back, he flew past his house without once swerving, and disappeared in a pine tree on the edge of the orchard, and a conclave of cedar waxwings in the next tree discussed his tactics enthusiastically. The cedar waxwings were also interested in the gray stump—but afraid of it? Oh no, not they! Care sits lightly on the cedar waxwing's topknot, and he never takes his dangers seriously.

A series of deceiving and circuitous flights finally landed Mr. Flicker at his own door, and he perched himself in his hiding-place of leaves and watched the gray stump with an air of settled gloom.

However, a bird is a bird, even though it be a serious flicker, and before many minutes he and his wife were chatting happily again. Mrs. Flicker even asserted boldly that if *she* had not her eggs to look after, she would certainly investigate this thing; and then Mr. Flicker began to preen his feathers as if in preparation for the undertaking, but really to gain time and get up his courage, when, "Take care! Take care!" came notes of warning from the catbirds; and the stump suddenly lengthened itself like a telescope and walked away, with its two-eyed instrument under its arm. Mr. and Mrs. Flicker watched it gather a spray of late apple blossoms, saw it climb the fence and disappear down the road.

"I beg your pardon," said polite little Mrs. Flicker to her husband. "I was wrong; it is not a stump. But," she added coaxingly, "it really is more like a stump than a person, now isn't it? And I should not be afraid of it again."

When Miss Melissa Moore, school teacher, returned to Manhattan after her summer vacation, she confided to a fellow-teacher that she had made seventy new acquaintances, and that she loved them all. Now Miss Melissa Moore, in her wildest dreams, never thought of herself as being beautiful, being a plain, honest person; she even knew that her bird-hunting costume—the short gray skirt and gray flannel shirt-waist and gray felt hat, whose brim hung disconsolately over her glasses, with no color at all to brighten her—was *not* becoming, but if she had dreamed that Mrs. Flicker had called her an old gray moss-covered stump, she would, being only human, have cut her once and forever, and her list of new acquaintances would have numbered sixty-nine.

REMEMBERED SONGS.

I walked an autumn lane, and ne'er a tune
Besieged mine ear from hedge or ground or tree;
The summer minstrels all had fared from me
Far southward, since the snows must flock so soon.
And yet the air seemed vibrant with the croon
Of unseen birds and words of May-tide glee;
The very silence was a melody
Sown thick with memoried cadences of June.

Shall we not hold that when our little day
Is done, and we are of men no more,
We still live on in some such subtle way,
To make some silence vocal by some shore
Of Recollection, or to only play
Soft songs on hearts that loved us long before?

—*Richard Burton.*

THE YELLOW-HEADED BLACKBIRD.

(*Xanthocephalus xanthocephalus.*)

THE geographical distribution of this member of the blackbird family is western North America to the Pacific Ocean, east to Wisconsin, Illinois, Kansas, and Texas. The bird is accidental in the Atlantic states. It is found generally distributed on the prairies in all favorable localities from Texas to Illinois. It is a common bird in the West, collecting in colonies to breed in marshy places anywhere in its general range, often in company with the red-winged blackbird. The nests are usually placed in the midst of large marshes, attached to the tall flags and grasses. Davie says they are generally large, light, but thick-brimmed, made of interwoven grasses and sedges impacted together. The eggs are from two to six in number, but the usual number is four. Their ground color is dull grayish-white, in some grayish-green, profusely covered with small blotches and specks of drab, purplish-brown and umber. The average size is 1.12 x .75.

Mr. Nelson says that the yellow-headed blackbird is a very common resident of Cook County, Ill., in large marshes. It arrives the first of May and commences nesting the last of that month. Owing to the restricted localities inhabited by it, it is but slightly known among farmers; even those living near the marshes think it an uncommon bird. The only difference in the habits of the male and female is the slightly greater shyness of the former. Colonies nest in rushes in the Calumet marshes, are bold and interesting, and adults are sometimes seen on the ground along country roads some distance from water.

The food of these birds during the nesting season is worms and grubs, which are fed each day to the young birds by the hundreds. In this way they help protect the crops of the farmer. In the autumn, when the young can fly as well as their parents, they collect in large flocks and start on their southern journey. At this time young and old travel together. Many of them are killed by hawks, which often follow a flock for days, dashing into their midst whenever they see a chance to capture one.

The blackbirds are alike in general characteristics. They all walk and get most of their food on the ground. In spring, when large flocks are roaming in all directions, one may easily be confused by them. Miss Merriam says that with a little care they will easily be distinguished. The crow blackbirds may be known by their large size and long tails. The male cowbird may be told at a glance, she says, by his chocolate-colored head, the red-wing by his epaulettes, and, we may add, the yellow-headed by the brilliant yellow of his whole head and neck, "as if he had plunged up to his shoulders in a keg of yellow paint, while the rest of his attire is shining black." He utters a loud, shrill whistle, quite unlike any sound produced by his kinsmen.

How sweet the harmonies of afternoon,
The blackbird sings along the sunny breeze
His ancient song of leaves and summer boon;
Rich breath of hayfields streams thro' the whispering trees,
And birds of morning trim their bustling wings,
And listen fondly, while the blackbird sings.

—*Frederick Tennyson.*

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YELLOW-HEADED BLACK BIRD.
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THE YELLOW-HEADED BLACKBIRD.

E. K. M.

THE little readers of *Birds and All Nature* will not have much respect for me, I am afraid, after reading what Mr. Wood Thrush said of my family in the last number of the magazine.

Probably you don't recollect it. Well, he said that my cousin, Mr. Red-Winged Blackbird, was often found in the company of Mr. Cowbird, and that Mr. Cowbird was a very disreputable creature, being no better than an outcast and a tramp.

Humph! Just as though birds, like boys and girls, are to be judged by the company they keep. Why, *I* associate with Mr. Cowbird, too; he is a distant relative of mine, and certainly nobody who looks at my picture can call me disreputable. See what a glossy black coat I wear and what a fine yellow collar and hat. We are only free in our manners, that is all, helping ourselves liberally to the grain planted by our dear friend, Mr. Farmer.

I am not lazy, either, like my relative, Mr. Cowbird, for I build a new house every spring, locating it among the tall flags and grasses in a nice damp piece of marshland.

Though I am a blackbird, I'm not found from the Atlantic to the Pacific, as Mr. Red-Wing is and others of our tribe. For that reason you can't call me common, you know. But, then, our manners and customs are about the same. We do not hop like other birds, but walk very much as you do, putting one foot before the other, a bit awkwardly, perhaps, but I am sure with considerable dignity. Indeed, my mate says but for cocking my head on one side when strutting on the ground one might take me for a bishop—in feathers—I have such a solemn, serious air, as though burdened with a sense of my own importance.

Like the generality of birds, I find a warm climate in winter conducive to my health, so in November I leave the north and hie me to the south, returning about the first of May, not so early as my cousin, Mr. Red-Wing, and the other common members of the blackbird family. They, like some visitors, welcome or unwelcome, usually come early and stay late.

It strikes me, for that reason, the blackbird family should be considered of some importance, even if they do associate with Mr. Cowbird, tramp that he is, for when the first flocks of blackbirds are seen sailing overhead, like leaves blown by the wind against the sky, you know that spring is near, no matter how cold or chill the weather may be. Crowds and crowds of us are then seen circling and wheeling above our last year's nesting-place, talking and laughing like little children and making just as much noise.

Con-cur-ee is the only song we know, but we utter that in different tones, so that our mates consider it very pleasing, and so may you.

WITH OPEN-EYES.

OLIVE SCHREINER.

. . . . . And now we turn to nature. All these years we have lived beside her, and we have never seen her; now we open our eyes and look at her. The rocks have been to us a blur of brown; we bend over them, and the disorganized masses dissolve into a many-colored, many-shaped, carefully-

arranged form of existence. Here masses of rainbow-tinted crystals, half-fused together; there bands of smooth gray methodically overlying each other. This rock here is covered with a delicate silvery tracery in some mineral, resembling leaves and branches; there on the flat stone, on which we so often have sat to weep and pray, we look down, and see it covered with the fossil footprints of great birds, and the beautiful skeleton of a fish. We have often tried to picture in our mind what the fossilized remains of creatures must be like, and all the while we sat on them. We have been so blinded by thinking and feeling that we have never seen the world.

The flat plain has been to us a reach of monotonous red. We look at it, and every handful of sand starts into life. That wonderful people, the ants, we learn to know; see them make war and peace, play and work, and build their huge palaces. And that smaller people we make acquaintance with, who live in the flowers. The citto flower had been for us a mere blur of yellow; we find its heart composed of a hundred perfect flowers, the homes of the tiny black people with red stripes, who moved in and out in that little yellow city. Every bluebell has its inhabitant. Every day the karroo (plain) shows up a new wonder sleeping in its teeming bosom. On our way we pause and stand to see the ground-spider make its trap, bury itself in the sand, and then wait for the falling in of its enemy. Farther on walks a horned beetle, and near him starts open the door of a spider, who peeps out carefully, and quickly puts it down again. On a karroo-bush a green fly is laying her silver eggs. We carry them home, and see the shells pierced, the spotted grub come out, turn to a green fly, and flit away. We are not satisfied with what nature shows us, and will see something for ourselves. Under the white hen we put a dozen eggs, and break one daily to see the white spot wax into the chicken. We are not excited or enthusiastic about it; but a man is not to lay his throat open, he must think of something. So we plant seeds in rows on our dam-wall, and pull one up daily to see how it goes with them. Alladeen buried her wonderful stone, and a golden palace sprang up at her feet. We do far more. We put a brown seed in the earth, and a living thing starts out, starts upward—why, no more than Alladeen can we say—starts upward, and does not desist till it is higher than our heads, sparkling with dew in the early morning, glittering with yellow blossoms, shaking brown seeds with little embryo souls on to the ground. We look at it solemnly, from the time it consists of two leaves peeping above the ground and a soft white root, till we have to raise our faces to look at it; but we find no reason for that upward starting.

A fowl drowns itself in our dam. We take it out, and open it on the bank, and kneel, looking at it. Above are the organs divided by delicate tissues; below are the intestines artistically curved in a spiral form, and each tier covered by a delicate network of blood-vessels standing out red against the faint blue background. Each branch of the blood-vessels is comprised of a trunk, bifurcating into the most delicate hair-like threads, symmetrically arranged . . . . Of that same exact shape and outline is our thorn-tree seen against the sky in mid-winter; of that shape also is delicate metallic tracery between our rocks; in that exact path does our water flow when without a furrow we lead it from the dam; so shaped are the antlers of the horned beetle. How are these things related that such deep union should exist between them all? Is it chance? Or, are they not all the fine branches of one trunk, whose sap flows through us all?

. . . . And so it comes to pass, in time, that the earth ceases for us to be a weltering chaos. We walk in the great hall of life, looking up and around reverentially. Nothing is despicable—all is meaning—full; nothing is small—all is part of a whole, whose beginning and end we know not. The life that throbs in us is a pulsation from it; too mighty for our comprehension, not too small.—*Story of an African Farm.*

BIRD NOTES.

ANNE WAKELY JACKSON.

DURING the late autumn days, when the summer chorus has dispersed, and only a few winter soloists remain to cheer us, one is more than ever impressed by the wonderful carrying power of bird notes. Many of these notes are not at all loud; and yet we hear them very distinctly at a comparatively long distance from their source.

The ear that is trained to listen will distinguish a bird's note above a great variety of loud and distracting noises. This is due, not to the loudness of the note, but to the quality of its tone.

We all know by experience, though few of us, alas, profit by it that when we wish to make ourselves heard, it is not always necessary to raise our voices, but only to use a different quality of tone.

Thus, some singers, when you hear them in a small room, seem to completely fill it with sound, while if they sing in a large hall, they can scarcely be heard at all beyond a certain distance. Their voices lack carrying power, and their notes apparently escape almost directly after leaving their mouths.

It is this carrying quality, which can be cultivated to a large extent in the human voice, that we find in bird notes. They produce their notes in a perfectly natural way. They do not, like us, have to be trained and taught to sing naturally.

I believe that nearly every human voice has some sweet or agreeable quality in it. If the owner would but use that part, instead of inflicting the harsh or strident or shrill part upon the unfortunate listener, what a musical world we should live in! No discordant voices! Think of it!

To go back to the birds. Here is an example of the penetrating quality of tone they possess. One morning I was busily engaged in the back part of the house, when my ear caught the sound of a bird's note, and I determined to follow it up.

It led me to the front part of the house, out of the front door, down the walk, across the street, and into a neighbor's yard where I found my "caller," a white-breasted nut-hatch, carefully searching the bark of a tall soft maple. His note did not sound particularly loud when I stood there near him. Yet I had heard it with perfect distinctness in the rear of the house.

What a penetrating quality there is in the high, faint "skreeking" of the brown creeper, and in the metallic "pip" of the hairy woodpecker.

The birds could teach us many a lesson on "voice production," if we would but listen to them.

The person who has never learned to listen, misses much of the beauty of life. For him "that hath ears to hear," when he goes abroad, the air is full of subtle music. Not merely the music of the birds, but other voices of nature as well; the wind in the trees, the rustle of leaves.

The unthinking person walks along the street, seeing nothing, hearing nothing. What does he miss? Many things. He misses yon tall tree, which suggests such strength, such enduring majesty. He misses the beautiful leaf that lies in his path, a marvel of exquisitely blended coloring. He misses the delicate tracery of slender twigs and branches, with their background of blue sky or gray cloud. He misses the voices of his feathered friends who would gladly cheer him on his way. If he thinks of nature at all, he is apt to think her beauties have departed with the summer. Not so. If you love nature, she will never withhold some part of her beauty from you, no matter how cold or windy or rainy the day may be. If you see no beauty it is not because it is entirely lacking, but because you are blind to it.

The love of nature is a great gift, a gift that is within the reach of all of us. Let us, then, cultivate this gift, and we shall find beauty and harmony and peace, such as we never dreamed of before. Our lives will become better and nobler for the contact with nature, and we shall be brought into a closer understanding of nature's God.

SOUTHWARD BOUND.

A FALL EXPERIENCE.

ELLA F. MOSBY.

IT was October 8, and many birds had gone on their long journey to tropical lands. The fog hung thick like a white blanket between the trees, and obscured all distant objects, such as mountain ranges or winding rivers, from view. My home was in Lynchburg, on the James River, and consequently in the line of the "birds' highway," and I was standing beside the window on the lookout for migrants, when, to my surprise, there alighted in the tree beside me a female scarlet tanager in olive-green and dusky yellow, with her soft, innocent eyes looking with gentle confidence around her. In a few minutes the trees around her were ringing with *chip cheer! chip cheer!* from a large flock of tanagers that had evidently lost their way in the fog, and descended near the ground to make observations. During the morning three different *waves* of migrating tanagers passed, flying slowly and so low that it was easy to see and recognize them.

The next day it was again thickly foggy. As I glanced out at the window I saw another tanager, sitting motionless on a bough. From ten to three wave after wave, in even greater numbers than the day before, passed. Frequently there were from three to nine tanagers perched in full view, occasionally calling *chip cheer!* but usually quietly resting or eating insects, of which the trees were full. I heard one *crunching* a hard-shelled bit in his strong beak. The scarlet of summer was not to be seen in the fall plumage of green and yellow, but the books are misleading when they speak of the male as "dull," or "like the female." It is true he is green above and yellow underneath, but where her wings are darker or "fuscous," his wings and tail are a glossy, velvety black, and instead of her dull yellow, his breast is a shinning and vivid lemon-yellow, so that he is almost as beautiful as in his black and scarlet. In such large flocks I saw every phase of varying yellow or green in the immature males and females, one of the latter seeming a soft olive all over, slightly greener above and slightly more yellow below. Even in the spring, when our woods ring with the joyous calls and songs of both varieties, I have never seen half the number of tanagers together.

I was interested in noticing how many of our migrating birds gathered in unusually large flocks. The oven birds and the mocking-birds were seen in large numbers before they left, for many, if not most of the latter, do go farther South in cold weather. I heard one of the mocking-birds singing the most exquisite song, but softened almost to a whisper, as if singing in a dream a farewell to the trees he knew so well. He sang in this way for quite a long while, the rest of the flock flying excitedly to and fro. I also saw a large flock of chebecs instead of the one or two scattered migrants I was accustomed to see in the fall. The gay-colored sapsuckers came to us in large flocks—they spend the winter with us—filling the trees around us.

For the first time, too, I had an experience of the caprices of migrating warblers. The blackpolls and pine-warblers, so numerous last year, had evidently chosen another route to the tropics, nor were the magnolia and the chestnut-sided to be seen. But the Cape May warblers, usually rare, were very numerous, and remained long—from September 20 to October 18. This might probably be explained by the abundant supply of food, for the unusual warmth of the season had not only awakened the fruit trees and lilacs, the kalmia and other wild flowers, to a second period of blooming, but had filled the air with immense swarms of tiny insects. Everywhere glittered and danced myriads of winged creatures, and the trees offered a plentiful table for our insect-loving warblers.

FROM COL. F. NUSSBAUMER & SON.
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BLACK SQUIRREL.
5/13 Life-size.

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THE BLACK SQUIRREL.

(*Sciurus niger.*)

Mrs Black Squirrel sat in the top of a tree;
" I believe in the habit of saving," said she;
" If it were not for that, in the cold winter weather
I should starve, and my young ones, I know, altogether;
But I'm teaching my children to run and lay up
Every acorn as soon as it drops from the cup,
And to get out the corn from the shocks in the field—
There's a nice hollow tree where I keep it concealed.
We have laid up some wheat and some barley and rye,
And some very nice pumpkin seeds I have put by;
Best of all, we have gathered, in all that we could
Of beechnuts and butternuts grown in the wood;
For cold days and hard times winter surely will bring,
And a habit of saving's an excellent thing.

" But my children—you know how young squirrels like play—
'We have plenty, great plenty, already,' they'll say.
'We are tired of bringing in food for our store;
Let us all have a frolic and gather no more!'
But I tell them it's pleasant when winter is rough,
If we feel both to use and to give we've enough;
And they'll find ere the butternuts bloom in the spring
That a habit of saving's an excellent thing."

The squirrels are found in all parts of the globe except Australia, where, however, there is a far worse pest of the agriculturist, the abundant rabbit. All the varieties, according to the authorities, correspond so closely in form, structure, habits and character that it is sufficient to describe the common squirrel and its habits, in order to gain sufficient knowledge of the whole tribe. The body of the true squirrel is elongated, tail long, and its fur evenly parted lengthwise along the upper surface. The eyes are large and prominent, the ears may be either small or large, scantily covered with hair or are furnished with tufts. The fore-legs are shorter than the rear. The fore-paws have four toes and one thumb, the hind-paws have five toes.

The time to see the squirrels is in the early morning when they come to the ground to feed, and in the woods large numbers may be seen frisking about on the branches or chasing up and down the trunks. If alarmed the squirrel springs up a tree with extraordinary activity and hides behind a branch. This trick often enables it to escape its enemy the hawk, and by constantly slipping behind the large branches frequently tires it out. The daring and activity of the little animal is remarkable. When pursued it leaps from branch to branch, or from tree to tree. altering its direction while in the air by means of its tail, which acts as a rudder.

It is easily domesticated and is very amusing in its habits when suffered to go at large in a room or kept in a spacious cage, but when confined in a little box, especially in one of the cruel wheel cages, its energies and playfulness are quite lost. The ancient Greeks were fully aware of its attractive qualities, and we are indebted to them for its scientific name. That name signifies "he who is under the shadow of his tail," and everyone who knows the meaning of the Greek word *sciurus* "must involuntarily think of the lively little creature as it sits on the loftiest branches of the trees."

The favorite haunts of the squirrel are dry, shady forests. When fruits and nuts are ripe it visits the village

gardens. Where there are many pine cones it makes its permanent home, building one or more, usually in old nests of crows which it improves. If it does not intend to remain long it uses the nests of magpies, crows, or birds of prey, but the nest which it intends to serve as a permanent sleeping-place, a shelter against bad weather, or a nursery, is newly built. It is said that every squirrel has at least four nests; but nothing has been definitely proven on this score. Brehm says they also build in hollow trees; that the open-air nests usually lie in a fork close to the main trunk of the tree; the bottom is built like one of the larger bird nests while above there is a flat, conical roof after the manner of magpies' nests, close enough to be impenetrable to the rain. The main entrance is placed sideways, usually facing the east; a slightly smaller loop-hole for escape from its many enemies is found close to the trunk.

According to the season it eats fruit or seeds, buds, twigs, shells, berries, grain and mushrooms. The seeds, buds and young shoots of fir and pine trees probably form its principal food.

As soon as the animal is provided with food in abundance it lays by stores for later and less plenteous times, carrying to its storerooms nuts, grains and kernels, sometimes from a great distance. In the forests of southeastern Siberia the squirrels also store away mushrooms, and that in a very peculiar manner.

"They are so unselfish," says Radde, "that they do not think of hiding their supply of mushrooms, but pin them on the pine needles or in larch woods on the small twigs. There they leave the mushrooms to dry, and in times of scarcity of food these stores are of good service to some roaming individual of their kind."

THE ROBIN'S MISTAKE.

L. WHITNEY WATKINS.

The scene was the bank of a crystal brook
Where a saucy young robin had paused to look,
As the morning sun had gilded the waves
Which sparkled and sang thro' the autumn days.
He glanced at the leaves, that had copied his breast,
The leaves that in springtime had shielded his nest;
Then turning his head with a bird like grace,
He searched in the stream for his mirrored face.
Not his mottled coat of rusty brown
He saw in the brook-bed sloping down,
But a touch of gray with an amber dab—
The reflected form of a brooklet crab.
He gazed in surprise at the specter-like thing,
Then chirping aloud and raising each wing,
In terror he turned from the ghost-haunted place
And met on the bank the real crab face to face.
Young Robins, like "others," are inclined to be "gay,"
And our hero's misfortune occurred in this way:
He considered a moment; his foe seemed quite weak,
And he ventured a peck with his slim, shiny beak.
A flutter, a scream—up the bank Robin came;
He found two could play at the same little game,
And the waves as they fled, with a smile and a gleam,
Carried crab and brown feathers adown with the stream.

THE DOVE. NOAH'S MESSENGER.

GRANVILLE OSBORNE.

AMONG the beautiful incidents of scripture none has become more familiar to old and young alike than that which relates how Noah "sent forth a dove from him to see if the waters were abated from off the face of the ground." We can imagine the timid messenger sent forth by Noah's hand from the open window of the ark. Over the vast surface of the waters it flew, in obedience to natural instincts, seeking a place of rest, but, as the narrative relates, "the dove found no rest for the sole of her foot, and she returned unto him into the ark, for the waters were on the face of the whole earth." With what an unerring flight the dove had returned to the only safe refuge, and how gently did Noah "put forth his hand" and "draw her in unto him," after the weary quest was over and the tired wings had only brought back a message of defeated hopes. After seven days had gone by Noah sent forth the dove again with longing expectancy that the flood might be receding. With swift flight the dove disappeared from view, and, high in air, sought amid the waste of waters, with its marvelous powers of sight, for any sign which told of safety and rest. At length it reached a refuge, the spot it sought, where the valleys once more began to show themselves above the depths. And in the evening, as Noah watched and waited at the open window of the ark, he saw afar off the glint of snowy wings against the golden sky, and "lo, the dove returned, bearing in her mouth an olive leaf plucked off, so Noah knew that the waters were abated from off the earth." The olive branch was a token that even the trees in the valleys were uncovered, and has been the type in all after ages of peace and rest. The Hebrew word "yonah" is the general name for the many varieties of doves and pigeons found in Bible lands. It is frequently used by the prophetic writers as a symbol of comparison. Both Isaiah and Ezekiel speak of doves that "fly as a cloud." In many of the wild valleys of Palestine the cliffs are full of caves, and there the wild pigeons build their nests and fly in flocks that truly are "like the clouds" in number. Again the same prophets speak of the "doves of the valleys, all of them mourning." This is peculiarly applicable to the turtle dove. Its low, sad plaint may be heard all day long at certain seasons in the olive groves and in the solitary and shady valleys amongst the mountains. These birds can never be tamed. Confined in a cage, they languish and die, but no sooner are they set at liberty than they "flee as a bird" to their mountains. David refers to their habits in this respect when his heart was sad within him: "O that I had wings like a dove, for then would I fly away and be at rest." Nahum alludes to a striking habit of the dove when he says: "And the maids of Hazzab shall lead her as with the voice of doves, tabering upon their breasts."

Hazzab was the queen of Nineveh, who was to be led by her maidens into captivity, mourning as doves do, and "tabering," or striking on their breasts, a common practice in that country.

David, in beautiful imagery, comforts those who mourn, saying: "Though ye have lain among the pots, ye shall be as the wings of a dove covered with silver and her feathers with yellow gold." A dove of Damascus is referred to whose feathers have the metallic luster of silver and the gleam of gold. They are small and kept in cages. Their note is very sad and the cooing kept up by night as well as by day.

To the millions who devoutly sing of the "Heavenly Dove" no other symbol either in or out of the Bible suggests so much precious instruction and spiritual comfort as this innocent bird—pure, gentle, meek, loving, faithful, the appropriate emblem of that "Holy Spirit" that descended from the open heavens upon our Lord at his baptism.

THE WEASEL.

(*Putorius vulgaris.*)

THIS is the smallest beast of prey, but so agile and courageous that it is regarded as a model of carnivorous animals. It dwells in fields, gardens, burrows, clefts of rock, under stones or wood piles, and roams around by day as well as by night. Its slender and attenuated shape enables it to enter and explore the habitations of the smallest animals, and, as it is a destroyer of rats, mice, and other noxious animals, it is useful and deserves protection. It is, however, hunted by many who do not appreciate its value.

The weasel attains a length of eight inches, including the tail. The body appears to be longer than it really is because the neck and head are of about the same circumference as the body. It is of the same thickness from head to tail.

This animal is found throughout Europe, Canada, and the northern portions of the United States. Plains, mountains, forests, populous districts, as well as the wilderness, are its home. It adapts itself to circumstances, and can find a suitable dwelling-place in any locality. It is found in barns, cellars, garrets, and similar retreats.

An observer says one who noiselessly approaches the hiding-place of a weasel may easily secure the pleasure of watching it. He may then hear a slight rustle of leaves and see a small, brown creature gliding along. As soon as it catches sight of a human being it stands on its hind legs to obtain a better view. "The idea of flight seldom enters this dwarf-like creature's head, but it looks at the world with a pair of bold eyes and assumes an attitude of defiance." Men have been attacked by it. A naturalist once saw a large bird swoop down on a field, pick up a small animal and fly upward with it. Suddenly the bird staggered in its flight, and then dropped to the ground dead. A weasel tripped merrily away. It had severed its enemy's neck with its teeth and thus escaped.

The weasel preys upon mice, house rats and water rats, moles, hares, rabbits, chickens, birds, lizards, snakes, frogs, fish, and crabs.

A litter of weasels numbers eight. The mother is very fond of the little blind creatures and nourishes them until long after they can see.

Buffon said this little animal was not capable of domestication, but as a matter of fact, when accustomed to people from childhood, it becomes very tame and attractive.

A lady tells the following anecdote of her pet weasel:

"If I pour some milk into my hand my tame weasel will drink a good deal, but if I do not pay it this compliment it will scarcely take a drop. When satisfied it generally goes to sleep. My chamber is the place of its residence and I have found a method of dispelling its strong odor by perfumes. By day it sleeps in a quilt, into which it gets by an unsewn place which it has discovered on the edge; during the night it is kept in a wired box or cage, which it always enters with reluctance and leaves with pleasure. If it be set at liberty before my time of rising, after a thousand playful little tricks, it gets into my bed and goes to sleep beside me. If I am up first it spends a full half-hour in caressing me, playing with my fingers like a little dog, jumping on my head and my neck with a lightness and elegance which I have never found in other animals. If I present my hands at the distance of three feet it jumps into them without ever missing. It exhibits great address and cunning to compass its ends, and seems to disobey certain prohibitions merely through caprice. In the midst of twenty people it distinguishes my voice, seeks me out and springs over all the others to come at me."

The weasel probably lives from eight to twelve years. It is easily caught in a trap, with bait of an egg, a small bird, or a mouse. No other animal is so fitly endowed for hunting mice.

In the attempt to check the rabbit pest in New Zealand, recourse has been had to the importation of natural enemies, such as ferrets, stoats, and weasels. In the Wairarapa district some 600 ferrets, 300 stoats and weasels, and 300 cats had been turned out previous to 1887. Between January, 1887, and June, 1888, contracts were made by the government for nearly 22,000 ferrets, and several thousand had previously been liberated on crown and private lands. Large numbers of stoats and weasels have also been liberated during the last fifteen years.

This host of predatory animals speedily brought about a decrease in the number of rabbits, but their work was not confined to rabbits, and soon game birds and other species were found to be diminishing. The stoat and the weasel are much more bloodthirsty than the ferret, and the widespread destruction is attributed to them rather than to the latter animal. Now that some of the native birds are threatened with extermination, it has been suggested to set aside an island along the New Zealand coast, where the more interesting indigenous species can be kept safe from their enemies and saved from complete extinction.

BIRDS AND THE WEATHER.

BIRDS are dependent on the elements as well as is man, and in the want of materials and the requirements in nest-building the birds are comparable to the lords of creation.

It is not a rare thing for a pair of robins to be badly handicapped in nesting-time by a lack of rain, for in May, and even in the showery month of April, there is occasionally a dry run of weather lasting for more than a week.

I have seen a pair of robins start a nest, and the dry weather would come on and stop operations, and the disconsolate pair would wait for the rain so that they could make mortar for their nest. Robins must have mud to use in the construction of their little home, and all the dry materials will avail them nothing unless there is a good stock of mortar on hand to cement the grass, rags, and other materials together.

On one occasion we supplied a pair of redbreasts with plenty of mortar by letting the hydrant run on the ground. The delighted robins immediately accepted the situation and gathered materials for the partially finished home, which was quickly completed and the four beautifnl eggs deposited. We broke the law by letting the water run, but then we can excuse ourselves in behalf of the faithful birds by saying that "necessity knows no law."

The eave-swallows also require mortar for the construction of their nests, and they select quarters not very far removed from lakes, ponds, or streams. There is a neighborhood where the swallows used to build in great numbers, and the barns were well patronized by these little insect-feeders, rows of the gourd-shaped nests being seen beneath the eaves.

At last the pond in the section was drained, and all the swallows deserted that neighborhood. There are very few birds which are not more or less affected by civilization, and a study of this subject is most interesting.

Years ago the chimney swifts were in the habit of building their stick nests in the hollows of big trees, and even at the present day we may find nests in these old-time situations. As time passed the swifts found that the chimneys of men's houses offered better situations for nests, and so the reasoning birds adopted our city and village chimneys to the abandonment of the primitive habit of nesting in hollow trees.—*Humane Alliance.*

STRANGE ILLUMINATIONS.

BIRDS THAT CARRY LIGHTS.

P. W. H.

"LIGHTNING BUGS" and other insects that carry lights are familiar in many parts of the country, but who ever heard of birds that carry lights? A strange story is told of the heron's powder patch which makes a two-candle light, which discloses a new idea in bird lore. A belated sportsman returning from a day's sport found himself late in the evening on the edge of a flat or marsh which bordered the path. The moon had not risen, and the darkness was so intense that he was obliged to move slowly and carefully. As he walked along, gun on shoulder, he thought he saw a number of lights, some moving, others stationary. As they were in the river bed, he knew that they could not be lanterns, and for some time he was puzzled; but, being of an inquisitive mind, he walked down to the water to investigate.

As the stream was a slow-running, shallow one, he had no difficulty in wading in, and soon convinced himself that the lights were not carried by men, and were either ignes fatui or from some cause unknown. To settle the apparent mystery he crept as close as he could, took careful aim and fired. At the discharge the lights disappeared, but, keeping his eye on the spot where they had been, he walked quickly to it and found, to his amazement, a night heron, upon whose breast gleamed the mysterious light.

"The sportsman told me of this incident," says a friend who knew him well, "and, while I had often heard of the light on the heron's breast, I never before could find anyone who had personally witnessed the phenomenon, consequently I propounded numerous questions. The observer saw the light distinctly; first at a distance of at least fifty yards, or one hundred and fifty feet. There were three lights upon each bird—one upon each side between the hips and tail, and one upon the breast.

"He saw the lights of at least four individuals, and was so interested that he observed them all carefully and, as to their intensity, stated to me that each light was the equivalent of two candles, so that when he aimed he could see the gun-sight against it.

"As to whether the bird had control of the light, he believed he did, as he saw the lights open and shut several times as he crawled toward the birds and he stopped when the light disappeared and crept on when it came again. The light did not endure long after the bird was shot, fading away almost immediately. In color the light was white and reminded the sportsman of phosphorescent wood.

"Stories of luminous birds have been related by sportsmen occasionally, but, so far as I know, exact facts and data have never before been obtained on this most interesting and somewhat sensational subject. A friend in Florida told we that he had distinctly seen a light moving about in a flock of cranes at night and became satisfied that the light was the breast of the bird. Another friend informed me that on entering a heron rookery at night he had distinctly observed lights moving about among the birds."

That herons have a peculiar possible light-producing apparatus is well known. These are called powder-down patches, and can be found by turning up the long feathers on the heron's breast, where will be found a patch of yellow, greasy material that sometimes drops off or fills the feathers in the form of a yellow powder. This powder is produced by the evident decomposition of the small feathers, producing just such a substance as one might expect would become phosphorescent, as there is little doubt that it does.

The cranes and herons are not the only birds having these oily lamps, if so we may term them. A Madagascar bird, called kirumbo, has a large patch

on each side of the rump. The bitterns have two pairs of patches; the true herons three, while the curious boat-bills have eight, which, if at times all luminous, would give the bird a most conspicuous, not to say spectral appearance at night.

Some years ago a party of explorers entered a large cave on the island of Trinidad that had hitherto been considered inaccessible. To their astonishment they found it filled with birds which darted about in the dark in such numbers that they struck the explorers and rendered their passage not only disagreeable, but dangerous. The birds proved to be night hawks, known as oil birds, and in great demand for the oil they contain, and it is barely possible that these birds are also light-givers. The powder-down patches of the oil bird are upon each side of the rump.

As to the use of such lights to a bird there has been much conjecture; but it is thought that it may be a lure to attract fishes. It it is well known that fishes and various marine animals are attracted by light, and a heron standing motionless in the water, the light from its breast, if equal to two candles, would be plainly seen for a considerable distance by various kinds of fishes, which would undoubtedly approach within reach of the eagle eye and sharp bill of the heron and so fall victims to their curiosity. If this is a true solving of the mystery it is one of the most remarkable provisions of nature.

There is hardly a group of animals that does not include some light-givers of great beauty; but it is not generally known that some of the higher animals also produce light at times. Renninger, the naturalist, whose studies and observations of Paraguay are well known, tells a most remarkable story of his experience with the monkey known as *Nyctipithithecus trivigatus*. He was in complete darkness when he observed the phenomenon, which was a phosphorescent light gleaming from the eyes of the animal; not the light which appears in the eye of the cat, but shafts of phosphorescent light which were not only distinctly visible, but illumined objects a distance of six inches from the animal's eyes.

The subject is an interesting one and research among the various phenomena disclosed by naturalists may discover many other animals capable of strange illuminations.

THE PINK HOUSE IN THE APPLE TREE.

NELLY HART WOODWORTH.

NOT the least interesting of my summer neighbors is a Quaker family named Chebec, the least fly-catchers.

They are little people, else they would not be least fly-catchers, plainly dressed, with olive shoulder-capes lined with yellow, wings finely barred with black and white and heads dark and mousy. The large eyes, circled with white, are as full of expression as a thrush's.

What is lacking in song is made up in an energy decidedly muscular, the originality of the note *chebec*, uttered with a jerk of the head or a launch into the air after some passing insect, never being confused with other bird voices.

It is not Chebec himself that commands my special admiration, but "Petite," his winsome little lady, with her rare gentleness and confidence. Our intimacy began when she was living on a long maple branch that nearly touched my chamber window, and she was dancing attendance upon four pure-white eggs when I became conscious of her neighborly intentions. She soon settled down into the most demure little matron, a regular stay-at-home, really grudging the time necessary for taking her meals. Later, when I "peeked in" at the nestlings, Petite only hugged them closer, nor did she leave until my hand was laid on her shoulder. We were soon fast friends. The most tempting morsels the neighborhood afforded were brought to her door, and, though she was unwearied in the family service, my efforts were

gratefully received, even anticipated. The following spring her choice of residence was a bough that hung over the door, coming to the end of the branch whenever I appeared in an effort to express her approval. For, you see, I had given her a quantity of strings and lace and cotton for her nest, and she was truly grateful!

Excess of splendor is always perilous. The work of art was no sooner completed than Robin Redbreast grew envious, rushed over and pulled out the finest strings, leaving the nest in so shaky a condition that the wind soon finished it.

Petite's feelings were deeply injured —she could not be induced to rebuild near her malicious neighbor.

To help her forget her troubles I gave her some yellow ravelings, much handsomer than those Robin had stolen.

Thoroughly consoled, she worked as fast as she possibly could until the last ray of light had faded. Knowing that Robin's impudence had delayed her spring's work, I did my best to supply her needs.

Altogether her patience was extreme. Occasionally she hinted gently that her time was precious or that I was keeping her waiting, as she hovered about my face or rested briefly upon my shoe, keeping a sharp lookout meanwhile upon the cloth I was raveling.

How she scampered off when it was ready, snatching it from my hand before it reached the ground!

The next day saw the new house completed—no ordinary affair, but a magnificent dwelling, yellow from foundation to rafter, with a long, fantastic fringe of the same floating from its rim and waving gracefully in every breeze.

Petite now became my attentive companion in my garden work, talking in subdued tones from the nearest branch as if she felt the seriousness of the occasion, circling in the air and alighting on the same bough in pretended alarm when I tried to touch her soft, delicate feathers.

May 3d of this present year she called softly from the orchard that she had arrived. For a few days she had little to say, wearied with the long journey and being broken of her rest, as must have been the case. She was not quite herself, either—really put on airs and kept at a distance; but when she began to think of housekeeping she was the same trusting darling that won my heart and gave me willing hands in her service.

We talked matters over on the piazza while she fluttered about my head, touched my hat with dainty feet, or poised before me to say in her own pretty way that it was quite time to be thinking of sitting. "What do you propose to do for me *this* year? How much help can I rely upon from you?" she asked as plainly as if she spoke English.

"Ah, Petite," I answered, "you must not demand *too* much. It is quite time the sweet peas were planted!" But words were useless; she coaxed, enticed, pleaded, until mine was a full and unconditioned surrender. "You deserve it, Petite, for your perseverance! You shall have the finest house that was ever seen in this section," I said, and with that promise we parted.

I found a quantity of jeweler's cotton, pink as a rosebud, soft and fluffy and light enough to satisfy the most fastidious bird architect. Small pieces were placed upon lawn and tree trunks, where Petite soon spied them; her first impulse was one of approval.

Not meaning to be rash in her judgment, her head was cocked cunningly on one side as she poised, eyeing them closely, until I feared that, dissatisfied, she would accuse me of breaking my promise.

When she seized one, cautiously, in her beak and sailed away with it trailing after her in the air my fears were over. As no harm attended its transfer to the orchard, where it was adjusted to her taste, her admiring mate left his fly-catching to help in the work, the cotton disappearing so rapidly there were signs of a corner in the market.

The nest, strengthened with a few strings, grew rapidly toward completion. To all appearance its unique beauty was a matter of congratulation, the builders regarding it from all sides with intense satisfaction.

FROM KŒHLER'S MEDICINAL-PFLANZEN.

QUINCE.

CHICAGO:
A. W. MUMFORD PUBLISHE

THE QUINCE.

(*Cydonia vulgaris, Pers., or Pyrus Cydonia, L.*)

BY DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy.

Of ripened quinces such the mellow hue.
—*Congreve Translation, of Ovid's Art of Love.*

THE quince is the pear-like fruit of a bush or small tree resembling the pear tree. The branches are spreading and of a grayish green or brownish green color. The leaves are simple, entire, ovate, with short petioles and distinct stipules. The lower surface of leaves and stipules as well as the young twigs and the sepals are densely covered with hair-cells producing a woolly appearance. The flowers develop in May and June and are usually solitary upon terminal branches. Calyx green with five foliaceous, serrate, reflexed lobes. Corolla of five separate ovate, rather large, pink petals. Stamens yellow, numerous (20); five styles and a five-celled ovary. The matured fruit is a pome. That is, the greater bulk consists of the thickened calyx enclosing the ovary. The form, size and color of the ripe fruit are shown in the illustration. Each cell of the ovary bears from six to fifteen seeds which resemble apple seeds very closely as to form and color.

The name *Cydonia* is derived from the name of the Greek city Cydon, now Canea, of Crete. The Cydonian apple of the Greeks was emblematic of fortune, love and fertility, and was dedicated to the goddess Aphrodite (Venus). It is a question whether Crete was the original home of the quince. Some authorities maintain that it found its way into Greece from upper Asia, Persia, or India. Wherever its first home may have been this plant was known in Greece 700 years B. C. From Greece the tree was introduced into Italy and Spain, from which countries it finally spread over central Europe. Charlemagne, Karl der Grosse — 812, was largely instrumental in spreading the quince in Germany.

The ancient Greeks made extensive medicinal use of the fruit. On account of its astringency it has been used in dysentery, hemorrhage, and other conditions requiring an astringent substance. At present it is little used, the seeds excepted.

The pulp is fibrous and tough; it is not edible in the raw state on account of its acrid, astringent taste. As a whole it is a discouraging and disagreeable fruit in spite of its beautiful yellow color and pleasantly aromatic odor. Mixed with apples it makes excellent pies and tarts. A marmalade is made from the pulp, also a delicious jelly. It is stated that the word marmalade is derived from *marmelo*, the Portuguese name for quince.

The seeds are extensively used on account of the mucilage of the outer surface (epidermal cells). A decoction commonly known as mucilage of quince seed is much used as a demulcent in certain diseases—in erysipelas, inflammatory conditions of the eyes and in other affections where mucilaginous applications are found useful. The Mohammedans of India value the seeds very highly as a restorative and demulcent tonic. European physicians have used them with much success in dysentery. The mucilage is also one of the substances used by hair-dressers under the name of *bandoline*.

Chemically the mucilage is simply a modification of cellulose. Pereira considered it a special chemical substance which he designated *cydonin*. The seed, about 20 per cent. of which is mucilage, will make a sticky emulsion with forty times its weight of water. As to its physical properties it closely resembles gum arabic and agar. There are, however, simple tests by means of which it is possible to distingu sh them. The seeds rubbed or crushed emit an odor resembling almonds, due to the presence of hydrocyanic acid.

Most of the quince seed of the market comes from southern Russia, south-

ern France and the Cape of Good Hope. It is cultivated in various temperate and subtropical countries.

The quince must not be confounded with the Indian "bael" fruit which is known in India as the Bengal quince. The Chinese quince is a species of pear. The Japanese quince is also a species of pear resembling the Chinese quince. It is a great garden favorite on account of its large scarlet or crimson flowers. The fruit, which is not edible in the raw state, resembles a small apple and is sometimes used for making a jelly. The Portugal quince differs from the ordinary variety by its more delicate coloring. It is, however, less productive than the common varieties.

DESCRIPTION OF PLATE.—*A*, flowering twig; *B*, fruit; 1, stipules; 2, flower in section; 3, stamen; 4, pollen; 5, style; 6, stigma; 7 and 8, fruit in sections; 9 and 10, seeds of one cell of the ovary; 11, seeds; 12, seed in sections.

THE YOUNG NATURALIST.

DIAMONDS AND GOLD.

CECIL RHODES says: "So long as women are vain and men foolish there will be no diminution in the demand for diamonds." He ought to know, for he is called the "Diamond King."

Thirty years ago John O'Reilly found some children at a farm house in South Africa playing in the evening with some beautiful stones that had peculiar forms and brilliancy. He took the finest to town with him and found it was worth $500.

People swarmed into the country where little children had rough diamonds for playthings, and over $400,000,000 worth of these crystals has been taken from Africa.

While the diamond excitement was still raging the people were inflamed at finding there was gold about them in great quantities. The diamond hunters in many instances became gold diggers, because there was even more money to be made in gold digging than in hunting for diamonds.

Last year nearly $75,000,000 worth of gold was produced in that country. That is more than we produced in the great gold fields of the United States all taken together. We crushed from the rocks and dug out of the dirt about $65,000,000 in gold. The famous gold fields of Australia yielded about the same amount as our own country.

So much wealth in Africa has embittered the people. The Dutch farmers, called boers, occupy the heart of the best country. They are not progressive, the English say. Perhaps they mean that the boers do not move away fast enough to suit the English. They have made trek after trek to get out of the way of the English. Trek means journey. But when they realized how much wealth there was about them in the country which they had thought was so poor, they decided not to make any more treks to let the British in.

These Dutch farmers withstood the English at Majuba Hill, Jan. 28, 1881, and killed off nearly all the British forces sent against them. In this fight they lost but fourteen men in killed and wounded, while wiping out their enemies. They celebrate this day as we do the Fourth of July. It is their day of independence, and they do not wish to give up the advantage it gave them. Sixty years ago less than five hundred boers under Andries Pretorius defeated twelve thousand Zulus, killing three thousand of them.

As the Dutch have such a good reason for trusting to their weapons there is little wonder that the gold and the diamonds of the country brought them into a war with England.

LIQUID AIR.

MANY substances have three forms—solid, liquid, and gaseous. It takes cold to change a gas to a liquid, and more cold to reduce the liquid to a solid. Steam, water, and ice are good examples.

Air is a substance that requires so much cold to reduce it even to a liquid state that we know nothing of it as a solid. Our Smithsonian Institution gave Professor Dewar of the Royal Institute of London a gold medal for his discovery in regard to reducing it to a liquid.

No artificial cold is intense enough to affect air except when it is confined under great pressure. When a gas is compressed and made cold it tends to liquefy. But it takes enormous pressure and intense cold to make liquid air.

It is a grayish substance that may be carried about like water. It has a tendency to steam up, and when its vapor comes into contact with flesh a cooling sensation is produced. But living flesh cannot long remain in contact with the liquid itself. It produces a wound much like a burn.

By careful use of liquid air in surgery, the flesh may be so put to sleep that the surgeon's knife is not felt by the patient as he watches the cutting. A cancer has been cut out by liquid air in a sort of burning process that needed no knife. Cremation has been accomplished by its use.

Cremation is burning. Burning is the union of oxygen with the substance consumed. Liquid air left exposed to common air evaporates and sends out its nitrogen so that almost pure liquid oxygen is left in the vessel. This placed in contact with the body to be consumed soon sends all except its mineral parts flying away in the atmosphere in a vapor thinner than smoke.

It is the coldest substance known. It takes an intense cold to produce it, and it has to remain cold much as ice is cold, only very much more so, as long as it is liquid air. For this reason it is carried about in vessels constructed so as to exclude the heat. Mercury dropped into it becomes a solid block, and meat quickly freezes so hard that it is brittle as glass and may be broken into a thousand pieces.

The liquid oxygen left after exposure of liquid air may be placed in a hollow in a cake of ice. Dip into it a watch spring and touch a lighted match to it and you will see the steel spring burn as if it were full of pitch.

Eight hundred gallons of common air are compressed into one gallon of the liquid. The liquid is unattractive and very common-looking. You would not suspect its great powers by merely looking at it in a dish. But when it expands into common air it has tremendous energy. A few drops confined in a closed iron pipe will explode and blow the metal to atoms.

When first produced it was so expensive a product that its value was above that of rubies. Now it is cheap and becoming more so. We expect it to become an ordinary article of commerce. One company is capitalized at $10,000,000 to push its use in place of steam and electricity.

Probably some of the companies advertising shares to sell are putting its powers far too high. One company's agents are representing that a very little of it in a cup will keep an icebox cold all day, and that a pound of it will reduce the heat in a large house on a warm summer day so that it may be kept cool at very small expense.

These extravagant claims are probably made for the purpose of deceiving people so they will buy shares. The facts seem to show that a pint of liquid air will not cool an ice box much more than will a pound of ice. The effect of a gallon of it in a large house would scarcely be felt in July, except for a short time in one or two rooms.

COMMON MINERALS AND VALUABLE ORES.

II.—QUARTZ AND THE SILICATES.

THEO. F. BROOKINS, B.S.
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COMPARATIVELY few persons associate the gem opal, with its brilliant internal colored reflections, with that material forming so large a part of the soil, sand. Yet the two are almost identical in composition. The mineral constituent of sand and of opal is quartz, though the latter often contains in addition some water.

Quartz is composed of the two elements occurring the most abundantly in the earth's crust, silicon and oxygen, both non-metals. As already indicated, the most common representative of the mineral substance is the sand of the soil. The sand grains are generally so eroded by the atmosphere and surface waters as to show little of the true quartz structure. A typical specimen of quartz, commonly known as "rock crystal," clear, transparent and approximately perfect in form, is not difficult to obtain for study. If not occurring in the particular locality it may be obtained from a dealer in minerals at slight expense. As studied by means of the rock crystal, quartz is remarkable for its transparency, its regular crystal form, and its great degree of hardness. Its transparency is such that printing may be read through the crystal. Its crystalline form affords an unfailing means to the mineralogist of recognizing the substance as quartz. If our specimen be large and perfect, we note that it is bounded by planes in such manner that we have a hexagonal prism terminated at either end by a hexagonal pyramid. With convenient apparatus for measurement, we learn the all-important fact to the mineralogist, that the angle between any prism face and an adjacent pyramid face is 141° 47′. The mineralogist obtains his accurate measurements by means of an instrument known as the goniometer. We may obtain cruder results by bending a readily flexible wire over the two faces, perpendicular to the edge of their intersection, until it is tight against either face. Then placing one arm of the bent wire along the base of a protractor, the point of flexure at the center of the base, the number of degrees between the two arms may be read, thus giving roughly the angle between the prism and pyramid faces of the quartz crystal. The great hardness of quartz is apparent in that it cannot be scratched with the point of a knife and that it will cut glass. Often clear parts of quartz crystals occur studding the surface of a rock structure, in the form known as a crystal aggregate. One property of quartz rock (any sandstone or quartzite) we must not fail to notice is the irregular fracture. This is recognized in the statement that quartz has no cleavage.

The study of the rock crystal should not lead us into the false conclusion that quartz is commonly transparent. Instead it occurs in various shades and colors from smoky white through yellow, red, purple, and brown to black. The cause of the abundance of sand on the soil surface is also liable to misinterpretation. While sand is naturally of great abundance, yet its commonness at the surface of the soil is due largely to its great resistant powers to the agencies of weathering.

Quartz has an economic value directly in glass sand and of course as a soil const[illegible] In the latter capacity, it is taken [illegible] many plants, and is the silica that studs the saw edges of the blades of sedges and grasses. The precious stones, agate, amethyst, and jasper are varieties of quartz.

The silicon that is so important a constituent of quartz, composes with aluminum a large part of various minerals comprised under the name feldspar. This substance is slightly less hard than quartz and has many

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QUARTZ AND SILICATES.
¾ Life-size.

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1—Asbestus. 2—Feldspar. 3—Quartz Crystal. 4—Small Garnets in rock. 5—Garnet. 6—Opal. 7—Smoky Quartz

variations in color; but, unlike quartz, shows regular cleavage faces. Feldspar is always crystalline, but good crystals are not common. It is very difficultly soluble, yet readily yields to the influence of weathering. A feldspathic rock hence readily crumbles. During the process of disintegration, the feldspar may change from a clear, hard, glassy mineral to a dull, opaque substance. This product of disintegration is our common white clay. With quartz, then, feldspar is of great importance in the forming of soil.

Allied to the feldspar group of minerals as regards cleavage, and yet of far different special characteristics is the class of substances known as mica. How many of us ever think of the so-called isinglass of our stove doors as a mineral substance? Yet transparent mica, muscovite, is the source of that household convenience. A study of the specimens of mica in our stove door will provide abundant ideas of the nature of mica. We have often noticed how, under the influence of excessive heat, the isinglass splits into thin sheets, thus showing the cleavage of the mineral. These plates of mica are of especial value in giving cleavage to rocks which would otherwise fracture irregularly. The cleavage of slates and of the common shale rocks is due to the presence of mica particles which have, at some period in the history of the earth's crust, through the action of heat and pressure, been arranged along definite planes. Isinglass represents the transparent variety of mica. Other varieties are brown and even black, owing to the presence of traces of potassium, magnesium, iron, etc., in varying degree. Some micas do not easily decay, and so we frequently see glittering particles among the fine grains of soil and the sands of beaches.

The minerals already mentioned, quartz, feldspar, and mica, are the components of a large part of our granites. In the case of the red Scotch granite, another silicate, hornblende, replaces the mica. Various silicates of economic value are asbestos, a variety of hornblende, and augite, which are silicates of magnesium and iron or calcium; and talc, which is a silicate of magnesium containing water. A great number of gems are found among the silicates, including tourmaline, garnet, topaz, beryl, and chrysolite.

THE DANGER FROM THE IMPORTATION OF ANIMALS.

AN abstract of J. S. Palmer's essay on "The Danger of Introducing Noxious Animals and Birds" appears in *Our Animal Friends*. There are several societies in this country for the express purpose of purchasing and importing European birds. One society in Cincinnati has contributed $9,000 to this object, and other cities have raised considerable sums. Our contemporary thinks it would be well that all such experiments should be made under the sanction of government experts of the Department or Agriculture. In addition to voluntary importations, it often happens that animals are unintentionally brought into the country, as trading-vessels have carried the European house mouse all over the globe, and the introduction of rabbits into Australia is perhaps the most striking example of the dangers of unconsidered importations. They were introduced for purposes of sport, and were liberated near Melbourne in 1864. Within twelve years they had spread over the country and become a veritable plague, and millions of dollars have been spent for bounties, poisons, and other methods of destruction. Thousands of miles of rabbit-proof fences have been built, and in 1887 no less than 19,182,539 rabbits were destroyed in New South Wales alone, and the rabbits seem to be on the increase. The little Indian mongoose was imported into Jamaica to cope with a plague of rats and proved most effective, but after it had destroyed the rats it turned its attention to the domestic animals and poultry, so that the islanders would now be glad if they could get rid of the pests. Such are a few examples of the danger of disturbing nature's balance.

THE AMERICAN BISON.

A REMARKABLE article recently appeared in the *Scientific American*, written by Prof. Chas. F. Holder, entitled, "A Crime of a Century," in which is described the extermination, the wiping out of the American bison.

"In 1870, and later," said an army officer, "the plains were alive with bison, and in crossing at places I had difficulty in avoiding them, so vast were the herds. If anyone had told me then that in twenty or thirty years they would have become almost entirely extinct I should have regarded the statement as that of an insane person."

We are able to corroborate this statement. In August, 1869, while crossing the Kansas plains in a stagecoach we had the privilege, as we regard it now, of seeing one of the largest herds of buffalo then remaining. When first seen, at a distance of from three to five miles, we could distinctly hear the roaring of the animals, who had been stampeded, perhaps by hunters, who were at that time wantonly destroying the grand creatures for their robes. That so many of these animals could have been killed in mere wantonness, says Prof. Holder, seems incredible when their vast numbers are realized. We first hear of the bison from Cortez and his followers in 1521. Montezuma had one in a zoölogical garden, the specimen, in all probability, having been caught in Coahuila. In 1530 Cabeza saw them in Texas, and in 1542 Coronado found a herd in what is now the Indian Territory, one of his officers describing them as horrible beasts that demoralized the horses. In 1612 Sir Samuel Argall observed herds of bison near the national capital, and, it is said, two hundred and eighty-seven years ago herds of bison grazed on the site of the capitol building at Washington. In 1678 Father Hennepin observed them in what is now northern Illinois, and in October, 1729, Col. W. Bird saw herds in North Carolina and Virginia. It is known, in fact, that the bison formerly ranged in millions from the Atlantic seaboard to the Gulf of Mexico, from Texas to the Great Slave Lake, and as far west as central Nevada. "As to their numbers, they were like the sands of the seashore, and the accounts given by those who hunted them twenty or thirty years ago to-day seem like vagaries of a disordered imagination." Colonel Dodge, in his memoirs, states that on one occasion he rode twenty-five miles in Arkansas, always being in a herd of buffaloes, or many small herds, with but a small separating strip between them. The animals paid but little attention to him, merely moving slowly out of the way or advancing, bringing the whole herd of thousands down on him with the roar of an avalanche. This he met by standing fast and firing when they came within short range, the shot causing them to divide. This he did as a protection, otherwise they would have run him down and crushed man, horses, and wagon. This herd was later found to be fifty miles wide and to occupy five days in passing a given point on its way north. It was estimated that the herd comprised half a millon buffaloes. A train on the Kansas Pacific road in that state in 1868 passed between the towns of Ellsworth and Sheridan—one hundred and twenty miles—through a continuous herd of buffaloes. They were packed so that the earth was black, and more than once the train was stopped, the surging mass becoming a menace to human safety. This is the same herd first seen by us in August, 1869, and again in 1871 and 1872. An army officer relates that he was at that time on duty in the pay department, which made it necessary for him to travel on the Atchison, Topeka & Santa Fe railroad. One day the train entered a large herd, which scattered and seemed to go wild at the shrieking of the whistle and the ringing of the bell. As the train went on the thicker they became, until the very earth appeared to be a rolling mass of humps as far as the eye could see.

Suddenly some of the animals nearest turned and charged; others fell in behind, and down upon the train they came like an avalanche. The engineer stopped the engine, let off steam and whistled to stop them, while the passengers fired from the platforms and windows with rifles and revolvers, but it was like trying to stay a tidal wave. On they came, the earth trembling, and plunged head down into the train. Some were wedged in between the cars, others beneath; and so great was the crush that they toppled three cars over and actually scrambled over them, one buffalo becoming bogged by having his legs caught in the window.

The question of interest to-day is how was it possible to destroy so many animals in so short a time and what methods were employed? Many were destroyed by stampeding over precipices. In 1867 two thousand buffaloes became entangled in the quicksands of the Platte river. At another time a herd was lost by breaking through the ice of Lac Qui Parle in Minnesota. The cold winters of the north killed many. But man was their greatest foe. He soon found that the buffaloes had a value. The Indians slaughtered them for their skins, bone and for food. The white man, however, killed for sport, for the hides and heads, and to provide the gangs of railroad men with meat. The animal at this time had a value estimated at $5, which was sufficient to attract an army of destroyers. One firm in New York between 1876 and 1884 paid for hides alone nearly $1,000,000. The government never interfered. The real extermination of the buffalo, in the opinion of Prof. Holder, was caused by the demands of trade, aided and abetted by sportsmen, Indians, and others; but the blame really lies with the government that in all these years permitted a few ignorant congressmen to block legislation in favor of the protection of the bison, so that all the efforts of humanitarians were defeated and the bills when passed pigeon-holed.

The still hunter was the most insidious enemy of the buffalo, a single man, by sneaking upon a herd, having been known to kill one thousand in a single season. Capt. Jack Bridges, of Kansas, killed 1,142 buffaloes in six weeks. In the different states there were regular killing outfits that cost, in rifles, horses, carts, etc., from $2,000 to $5,000. Such methods developed some famous characters. Buffalo Bill (Col. W. F. Cody) was one. He contracted with the Kansas Pacific railroad to furnish them with all the buffalo the men could eat as the road was built; and, according to Mr. Cody's statement, they ate 4,280 buffaloes in eighteen months, for which he received $500 per month, "the price he paid for his title."

There were living at the last government census, made in 1891, 256 pure-blooded buffaloes in captivity, the last of the race.

A buffalo robe is now a scarce article and a well-preserved specimen brings a high price. Massive heads of old bull buffaloes are preserved in many museums and are valued at from $150 to $250.

Mark Twain once said that the most wonderful scene he had ever looked upon was an enormous herd of buffaloes in Colorado.

Mr. John D. Dunham, formerly United States land commissioner in Wyoming, and later connected with the Yellowstone Park commission, recently stated that there were between 120 and 140 buffaloes left in the United States last autumn, and the mortality among the surviving beasts was greater last winter than ever before during their captivity. Despite the severe penalty for killing the big animals in the National Park, a dozen or more buffaloes have been slain there every year. Last year a form of influenza destroyed some of them, and there are probably no more than fifty of the veterans of the plains left. Baker, in his "Wild Beasts and Their Ways," says: "The bison is a grand-looking creature, and in my opinion it is the most striking of all wild animals."

THE TURTLE DOVE.

GRANVILLE OSBORNE

In and out the leafy shade
Of the peaceful glen and glade,
Where the brook goes rippling by,
Through the cowslip meadow nigh;
When the soft and odorous breeze
Whispers gently 'mongst the trees,
Lovingly, I hear them woo—
"*Coo goo-roo-o-o, Coo-goo-roo-o-o.*"

Bows and bridles proudly he,
Coyly shy and modest she;
Hither, yon, in ceaseless quest,
'Till they build a cozy nest;
Full of watchful care is he,
When there comes maternity;
Never lover's song so true
"*Coo-goo-roo-o-o, Coo-goo-roo-o-o.*"

Now so proud he tabers low,
To his loving mate below;
Never lover so in love,
As this billing, cooing dove.
Back and forth he quickly flies
With his generous supplies,
Then he nods, "There, that will do—
"*Coo-goo-roo-o-o, Coo-goo-roo-o-o.*"

Beautiful, the little brood
Blesses faithful motherhood,
And the lessons they impart,
Doves and nestlings, reach my heart.
What the wisdom from the dove?
That the best of life is "love."
So I listen while they coo—
"*Coo-goo-roo-o-o, Coo-goo-roo-o o.*"

THE SORROWFUL TREE.

THERE is a tree in Paris to which the name "The Sorrowful Tree" is given. Perhaps because it blooms only in the evening.

When the first star appears in the heavens, the first bud of the Sorrowful Tree opens, and as the shades of night advance and the stars thickly stud the sky, the buds continue gradually opening until the whole tree looks like one immense white flower. On the approach of dawn, when the brilliancy of the stars gradually fades away in the light of day, the Sorrowful Tree closes its flowers, and ere the sun is fully risen not a single blossom is visible. A sheet of flower dust, as white as snow, covers the ground around the foot of the tree, which seems blighted and withered during the day, while, however, it is actively preparing for the next nocturnal festival. The fragrance of the blossom is like that of the evening primrose.

If the tree is cut down close to the roots a new plant shoots up and attains maturity in an incredibly short time.

In the vicinity of this singular tree there usually grows another, which is almost an exact counterpart of the Sorrowful Tree, but less beautiful, and, strange to say, it blooms only in the daytime.

MARKED WITH BLEEDING HEARTS.

IN one of the cages at Lincoln Park are two pigeons or doves most peculiarly marked. They belong to the variety known as the "Bleeding Heart."

Their backs and wings are of a bluish slate color, while their breasts are white, save for a spot of vivid crimson in the center. This spot is precisely like the stain which would be produced by a wound. It is about an inch in length, and the color fades out at the edges softly in little streaks.

One can scarcely believe the little creatures are not victims of some cruel thrust, and the park employes say that lovesick people are wont to lean for hours on the railing opposite the cage, and, fixing their sad eyes on the birds, will moan in sympathy while they shed bitter tears.

LILY OF THE VALLEY
Life-size.

CHICAGO:
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THE LILY OF THE VALLEY.

PROF. W. K. HIGLEY,
Secretary Chicago Academy of Sciences.

Fair flower, that, lapt in lowly glade,
Dost hide beneath the greenwood shade,
  Than whom the vernal gale
None fairer wakes, on bank or spray
Our England's lily, of the May,
  Our lily of the vale!

Of thy twin-leaves the embowered screen,
Which wraps thee in thy shroud of green;
  Thy Eden-breathing smell;
Thy arch'd and purple-vested stem,
Whence pendant many a pearly gem,
  Displays a milk-white bell.

—*Bishop Mant.*

THE lily of the valley is one of the most delicate and beautiful of the lily family (*Liliaceæ*). With the exception of the orchid family probably no group of plants furnishes a larger variety of popular forms noted alike for their beauty and delicacy.

It has been truly said of the lily family that "the flowers of most are beautiful, of many brilliant, and of some truly splendid." This family contains about one hundred and fifty genera and over thirteen hundred species. They are world-wide in their distribution, excepting the Arctic zone, though they are more common in the temperate and subtropical regions.

Among the species sought by the lover of cultivated flowers none is more noteworthy than the tulip, a native of Persia. It is claimed that there are more than seven hundred forms of the tulip known to the florist—all variations of a single species.

The type of the family is the lily. The lily is the Persian personification of night, *lil* or *lilleh* being essentially the words used to designate evening. It is the Indo-Iranian analogue of the rose, which in countries speaking the romance languages, as well as in China, stands for a symbol of secrecy and was planted over graves as an emblem of immortality.

To this family also belong the day-lily, the tuberose, the hyacinth, the yucca, and the star-of Bethlehem. Here also is classed the useful though much-abused onion, the flowers of which, though small, form a most graceful group at the top of the stem, especially in the wild species.

Asparagus is usually placed in this family and many species, such as squills and the varieties of aloes, are highly valued in medicine. In fact it may be said that the family "abounds in a bitter, stimulant principle and also in mucilage." It is of interest that some of the species of this family were prized by the Greeks and Romans for their medicinal value. The name for aloes in both languages refers to the bitter principle, and no name could be more appropriate, as the extract is intensely bitter.

The lily of the valley (*Convallaria majalis, L.*) is a native of the mountainous regions of Virginia and southward through Georgia. It is identical with the cultivated form which was brought from Europe.

The generic name *Convallaria* is from two Latin words meaning "with" and "valley," having reference to its habit of growing on mountain sides. This sweet-scented plant has an underground stem which sends up a stalk that bears, chiefly on one side, numerous nodding white flowers. The oblong leaves, usually two in number, rise from the base of the flower-stalk, which is sheathed by their stems.

The pure white of the flowers as well as their symmetrical form has led writers to speak of them as the symbol of purity, and no flower, perhaps, is in greater demand for the decoration of the church and home.

MUSHROOMS ON BENCHES.

RICHARD MAXWELL.

TO the amateur grower mushrooms are ordinarily an uncertain quantity. This crop is as fickle and finnicky as the proverbial old maid—although, for my part, I would far rather tackle the mushrooms.

The amateur mushroom grower, in the usual order of things, generally has "troubles of his own," troubles in which even the old expert shares at times, and often for a reason that is inexplicable, or for a cause that is not even apparent.

Some time ago I became interested in a rather novel scheme in 'room production: It is that of growing the 'rooms on top of the benches as one would his regular crops of lettuce, radishes, etc., instead of under the benches and in cellars in especially prepared beds for that purpose. With this new method the 'rooms are grown at the same time as and among the usual crops. In view of the experience I feel justified in saying that a profitable crop of 'rooms may be grown with more certainty by this method than by the one ordinarily practiced. I am not aware of a single instance where a grower of ordinary intelligence has ever failed to secure a satisfactory crop in this way.

The soil used is much the same as the ordinary compost as generally put up by the average hothouse operator. In combination with the usual mixture of rotted sod and horse manure the addition of cow dung, at the ratio of about one to ten, may be advantageously made.

Should the cow dung be used it is best to have that which is at least one year old and in a fine, pulverized condition, being careful to have the cow dung well incorporated with the compost.

After the soil is placed in the benches the bed may be immediately spawned; no waiting for temperature to go up or down. This work is done just as in spawning an old-fashioned bed, except that the spawn should be buried somewhat deeper, to guard against the surface drying of the soil during a hard day's sun on the glass.

Since the operation of a hothouse is a hard business proposition to the general grower, involving the question of the greatest production on the space at hand, it is advisable to get a crop growing on the benches as quickly as possible after the bed is spawned.

If, some crop that will rapidly cover the surface of the bed is not planted immediately after spawning it is advisable to furnish some sort of a mulch to protect the soil from the direct rays of the sun. It is all the better to provide such a mulch even with the planted crop, filling in the unprotected spaces. Partially decayed leaves, fine salt hay, or any light, fluffy material will serve the purpose. Providing this mulch does not become soggy or heavy there is no necessity for removing it during the bearing season of the mushroom.

Should the regular bench crop, lettuce, for instance, be depended upon to furnish shade, some more or less accurate calculation should be made on having such crop on the beds so that it will protect the mushrooms when they first make their appearance.

There is one other condition upon which success is contigent, and that is in the proper watering of the soil or secondary crops. Water should be applied lightly and frequently with a spray nozzle, the object being to maintain sufficient moisture in the soil to supply the needs of the surface crop without soaking or flooding the soil to such a degree that it becomes unduly heavy or soggy.

In cultivating the surface crop the operator should not stir the soil to a greater depth than two inches, that the spawn may not be disturbed.

When the crops are cleared from the benches in the spring it is well to allow a dense mat of weeds to grow up to protect the mushrooms from the sun, which, otherwise, would "burn" or brown them.—*American Gardening.*

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

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A BABY HERON.

REST H. METCALF.

HOW many of the boys and girls who read BIRDS AND ALL NATURE ever saw a baby heron? I am sure you would like to see ours. He measures from tip to tip of his wings, that is, with his wings spread just as far as we could stretch them, five feet and ten inches, and from the tip of his bill to the tip of his toe very nearly five feet. Now, isn't that a little baby? He is nearly full-grown but has not on the dress of the old birds; that is why we call him baby. He is called a crane by some people, but his right name is great blue heron, and his scientific name is *Ardea herodias*. Shall I tell you about his dress? His head is all dusky now, but when he puts on his new dress his forehead and central part of the crown will be white enclosed by a circle of black—a fine black crest with two elongated black plumes that make him appear to be very much dressed up. His back and wings are blue-gray, but like his head will be decorated with elongated scapulæ feathers, when he gets on his dress suit, and his long neck, which now has a rather dingy look, will have a beautiful collar of cinnamon brown tinged with purple and a white line in front from throat to breast. The tail is short and very inconspicuous. He really is a beautiful bird in spite of his long neck and long legs.

He is the largest of our New England herons and is not very abundant. You may find him about large bodies of water, and during the daytime he prefers the solitude of the forests and sits quietly in tall trees for hours, but in the early mornings and late afternoons he may be seen standing motionless at the edge of the water until a fish or a frog appears, when, with unerring stroke of his long beak, as quickly as lightning, he seizes it and beats it until dead, then swallows it; this act is often repeated. He varies his diet with meadow mice, snakes, and insects, so he certainly does not lead a very monotonous life. Our baby ate for his last breakfast four good-sized perch. Wasn't that a fine breakfast? I know you would like to hear about his early home. It was in a terribly dismal swamp, where it was almost impossible to reach, through mud to your knees and through briers and tangled bushes high as your head. There, several feet above your head was a nest, nearly flat, made of different sizes of twigs put together in a loose and lazy manner. Usually there are three or four light bluish-green eggs. Only one brood is reared in a season.

There are some people who say that the blue heron is good for food, but those who have once tried it do not care for another plate. They are the most suspicious of our birds and the hardest to be approached for they are constantly on the lookout for danger and with their long necks, keen eyes, and delicate organs of hearing, they can detect the approach of a hunter long before he can get within gunshot. They have a very unmusical voice, their call being a hoarse guttural "honk."

Once they were found in larger numbers, but now are seldom seen but in pairs or singly, and what a pity that foolish fashion of trimming ladies' hats has nearly exterminated so many varieties of beautiful birds! God gave us many beautiful things to enjoy in this world, and are they not more beautiful when we can see them alive in nature just where God placed them, than they are when dead and taken by pieces to adorn our heads?

THE KILLDEER.

(*Aegalitis vocifera.*)

DR. LIVINGSTONE described a relative of this bird which he met with in Africa as "a most plaguey sort of public-spirited individual that follows you everywhere, flying overhead, and is most persevering in his attempts to give fair warning to all animals within hearing to flee from the approach of danger," a characteristic which has caused the killdeer to be an object of dislike to the gunner. It is usually the first to take alarm at his approach and starts up all other birds in the vicinity by its loud cries. It can run with such swiftness that, according to Audubon, to run "like a killdeer" has in some parts of the country passed into a proverb. It is also active on the wing and mounts at pleasure to a great height in the air, with a strong and rapid flight, which can be continued for a long distance. In the love season it performs various kinds of evolutions while on the wing.

This plover is found throughout temperate North America to Newfoundland and Manitoba, nests throughout range, and winters south of New England to Bermuda, the West Indies, Central and South America. From March to November, and later, it is resident, and is very abundant in spring and autumn migrations. These birds are generally seen in flocks when on the wing, but scatter when feeding. Pastures and cultivated fields, tracts of land near water, lakesides and marshes seem necessary to it. The sound uttered by it, *kildeer*, *kildeer*, *dee*, *dee*, is almost incessant, but it is often low and agreeable, with a plaintive strain in it. When apparently in danger the voice rises higher and shriller. Cows, horses, sheep, and the larger poultry that wander over a farm are said not to alarm these birds in the least. But they are wild in the presence of man wherever they have been persecuted. They will often squat till one is close upon them, and will then suddenly fly up or run off, startling the unwary intruder by their loud and clear cry. In winter the killdeer is an unusually silent bird, in which season it is found dispersed over the cultivated fields in Florida, Georgia, the Carolinas, and other southern states, diligently searching for food. Davie says that it may often be heard on moonlight nights. The nest is placed on the ground, usually in the vicinity of a stream or pond, often on an elevated spot in the grass or in a furrowed field. It is merely a slight depression in the ground. The eggs are drab or clay color, thickly spotted and blotched with blackish brown and umber, small and quite pointed. They are generally four in number, measuring 1.50 to 1.60 long by about 1.10 broad.

The plovers resemble the snipe in structure, but are smaller, averaging about the size of a thrush. Their bills also are shorter. They have three toes usually; their bodies are plump; short, thick necks, long wings, and in some instances they have spurs on the wings. They pick their food, which is largely of an animal nature, from the surface of the ground, instead of probing for it, as their shorter bills indicate. The flesh of the killdeer is not highly regarded as a food.

COTTON TEXTILES. II.

W. E. WATT, A. M.

COTTON is spun and woven into so many useful forms that we could hardly live without it since we have become so thoroughly accustomed to the comforts and luxuries it supplies to us. From the loose fiber that we use in treating our teeth when they get to troubling us to the delicate lace handkerchief which is such a dream of the weaver's art we use cotton for our commonest and our most extraordinary purposes.

Muslin takes its name from Mosul, in India, where it was first made. Although muslin is now made in both Europe and America in great quantities, the kind that is most famed for its fineness is that from Dacca, India. To get an idea of the fine threads used in making the rarest of this muslin we must note that one pound of cotton is spun into three hundred eighty hanks of thread with eight hundred forty yards of thread in each hank. This means that one pound of cotton is spun out to the length of 319,000 yards, or over one hundred eighty-one miles.

One pound of this thread would, if it could be stretched out without breaking, reach from New York City up the Hudson to Albany, and there would still be enough of it unused to reach over to Saratoga. Ten pounds would reach from New York city to Omaha, with enough left over to reach back to Chicago.

It is even possible to exceed this in fineness if we do not care for use. To show the perfection of a machine, a thread of the fineness of 10,000 has been spun. If this could be strung out, as suggested above, it would reach 4,770 miles. One pound of the finest fiber has thus been spun so that it would reach from New York to Naples, Italy, and there would still be enough of it left to reach half-way back to London on the return trip.

Where three hundred and eighty hanks of thread are spun from a pound the muslin made from it is called three hundred eighty-degree muslin. But even this is not the finest muslin made. It is the finest made by the old hand processes, but the perfections of machinery have made it possible for us to have seven hundred-degree cotton. A strange thing about our finest machine-made cotton is that it does not seem to the eye or the touch to be as fine as the Dacca. There is a peculiar softness which cannot be imitated by the machine.

I went the other day into one of our great dry-goods stores to see how fine a piece of cotton I could buy. I was surprised to find that the gentlemanly clerks knew very little about where the goods were made and almost nothing at all about the processes. They were very obliging, but their business of selling does not seem to require any knowledge of those things I was so desirous of learning.

The finest things I found were India linen and Swiss mull. The India linen has a remarkable name, seeing it is not linen and is made in Scotland. The Swiss mull is nearly as well named, for it is also made in Glasgow. Whether these goods sell better because their names seem to indicate that they are made somewhere else I cannot say, but the truth seems to be that they were called by these names innocently enough by those who first made them, being proud that they could produce mull equal to the finest worn by the ladies in Switzerland or equal to the finest products of the Indian looms.

It is well known that in the dry-goods business it seems to be greatly to the advantage of the merchant to have fine names for his wares, the larger houses regularly employing women who do nothing but find fancy names for the things that are for sale. Goods are sometimes displayed with one name for several days without finding a purchaser, but the namer soon comes in with a new name to attach to the goods and some of the very shop-

pers who do not care for them under the first name buy them readily under the new one.

A lady recently asked me to tell her the difference between muslin and long cloth. I thought there might be a difference, but have been unable to find anyone who can tell what it is. Both names are applied to white cotton goods of various degrees of fineness. Long cloth is of a superior quality of cotton, and so is muslin when intended for dress goods. Some of the names under which white cotton goods are sold are muslins, tarletans, mulls, jaconets, nainsooks, lawns, grenadines, saccarillas, cottonade, cotton velvet, and velveteen.

Cotton is rarely manufactured where raised. It is carried to the seacoast as a rule by river steamers, though there have been instances where the laziness and ingenuity of man have combined to send it down-stream in bales completely covered with india rubber wrappings, so they floated to their destination with little care and no harm from water.

With all our boasted Yankee shrewdness and cunning in mechanics we do not make up the finer grades of cotton very extensively. As a rule the coarser kinds of cloth that take much material and less skill are made here, while the finer grades that get more value out of the pound of cotton are made abroad, chiefly in Great Britain.

As an indication of this the figures taken in the year 1884 form a striking illustration. The average amount of cotton spun by each spindle in Great Britain that year was thirty-four and a half pounds, while the amount consumed by each spindle in America averaged just sixty-five pounds, showing that the products of our spindles are just twice as heavy on the average as those of the English and Scotch. A fortunate thing about our goods when sent abroad is that they are accurately marked and prove to be very nearly what they are represented. This is not the case with goods shipped out of Great Britain, where their long experience in handling cotton has made them more expert than we in stuffing their goods with sizing and other adulterations which make the goods deceptive. There is so little tendency in this direction among American manufacturers that our good name has given us an advantage in China and India, where our manufactures are much more readily sold than what purport to be the same of British make.

Most of our cotton that is not exported is made up into yarns, threads, and the coarser goods, such as shirtings, sheetings, drills, print cloths, bags, and so forth. Yet there are several of our mills, especially in the North, that turn out the finer fabrics with great credit to the country. Large quantities of cotton are, of course, used up in woolen mills, where mixed goods are made, and hosiery mills, felt factories, and hat works consume it largely. Much cotton also goes into mattresses and upholstery.

It comes from a boll having three or five cells. This bursts open when it is ripe. Cotton fiber is either white or yellow, and varies in length from a little over half an inch to two inches. When gathered it is separated from its clinging seeds by the cotton gin, and is then pressed firmly in bales weighing about five hundred pounds each, although in some countries the customary sizes of bales vary two or three hundred pounds from this weight.

Of the twenty or more varieties of cotton but two are given much attention in the United States. These are the famous sea island cotton and the common, woolly-seed kind. The sea island cotton grows on the islands off the coast of South Carolina, in Florida, and on the coast of Texas. The peculiar salt air and humidity of these coasts seem necessary to its perfection, for when it is planted in the interior it quickly loses its best qualities and becomes similar to the common variety. Its fibers are long and silky, and used for the finest laces, spool cotton, fine muslins, and such goods, but there is so little of it as compared with the woolly seed cotton that it is but an insignificant part of our great crop.

Cotton is the only fibre that is naturally produced ready to be worked directly into cloth without special chemical or mechanical treatment. It is the

great article of comfortable and cheap covering for man's person. When gathered and baled it is in a knotted and lumpy state, from which it is rather difficult to extricate the fibers and arrange them for spinning. As we follow the cotton through the mill we come to these machines in the following order: It goes to the opener first, where it is beaten and spread out so that a strong draft of air drives out much of its impurities; it then goes to the scutcher after being formed into laps; the lap machine makes it into flat folds; the carding engine not only cards it but straightens the fiber and gives it another cleaning; in the drawing frame it is arranged in loose ropes with the fibers parallel; then the slubbing frame gives it a slight twist; the intermediate and finishing frames twist it still farther, especially when preparing it for the higher numbers; the throstle frame prepares coarse warps; and on the mules, either self-acting or hand, the coarse or fine yarns are spun. In some systems several operations are performed by the same machine.

Weaving follows. It consists in passing threads over and under each other as a stocking is darned, the main difference being that in darning the needle passes up and down to get over or under the threads it meets, while in weaving the threads met by the moving thread move out of the way so the shuttle may pass straight through the whole width of the cloth. As the shuttle comes back the threads are reversed so that the ones that were up before are now down and those that were down are now up. The machine that holds many threads for this work is the loom.

An English clergyman by the name of Edmund Cartwright has the credit of inventing the power loom. His description of his labors is interesting. We copy from one of his letters: "Happening to be in Matlock in the summer of 1784, I fell in company with two gentlemen of Manchester, when the conversation turned on Arkwright's spinning machinery. One of the company observed, that as soon as Arkwright's patent expired, so many mills would be erected, and so much cotton spun, that hands never could be found to weave it. To this observation I replied, that Arkwright must then set his wits to work and invent a weaving mill. This brought on a conversation on the subject, in which the Manchester gentlemen unanimously agreed that the thing was impracticable; and, in defense of their opinion, they adduced arguments which I certainly was incompetent to answer, or even to comprehend, being totally ignorant of the subject, having never at that time seen a person weave. I controverted, however, the impracticability of the thing, by remarking that there had lately been exhibited an automaton figure which played at chess."

"Some little time afterward, a particular circumstance recalling this conversation to my mind, it struck me that, as in plain weaving, according to the conception I then had of the business, there could only be three movements, which were to follow each other in succession, there would be very little difficulty in producing and repeating them. Full of these ideas, I immediately got a carpenter and smith to carry them into effect. As soon as the machine was finished I got a weaver to put in the warp, which was of such material as sail-cloth is usually made of. To my delight a piece of cloth, such as it was, was the product. As I had never before turned my thoughts to anything mechanical, either in theory or practice, nor had ever seen a loom at work or knew anything of its construction, you will readily suppose that my first loom must have been a most rude piece of machinery. The warp was placed perpendicularly, the reed fell with a force of at least half a hundred weight and the springs which threw the shuttle were strong enough to have thrown a Congreve rocket.

"In short, it required the strength of two powerful men to work the machine at a slow rate and only for a short time. Conceiving in my great simplicity that I had accomplished all that was required, I then secured what I thought a most valuable property by a patent, 4th of April, 1785. This being done, I then condescended to see how other people wove. And you will guess

my astonishment when I compared their easy mode of operation and mine. Availing myself, however, of what I then saw, I made a loom, in its general principles nearly as they are now made; but it was not until the year 1787 that I completed my invention, when I took out my first weaving patent Aug. 1 of that year."

As usual this worthy man, who had won the right to the title he received, was not the only discoverer or inventor of the thing credited to his name. Long before his time a description of a similar loom had been presented to the Royal Society of London, but he had no knowledge of it. He spent between £30,000 and £40,000 bringing his invention to a successful stage, but failed to make it profitable to himself. A small return was made to him later, at the suggestion of the principal mill-owners of the country, when he received from the government the sum of £10,000. His work has been much improved in detail since, but it has never been altered in its main principles.

But with all our arts and marvelous machines the most beautifully fine cotton fabric is yet the Dacca muslin. It is called "woven wind," and when spread out upon the grass it is said to resemble gossamer. It used to be made for the Indian princes before the days when the British took possession of the country. It was made only in a strip of territory about forty miles long and three miles in width. With the change in rulers the weavers largely dropped the work which they and their ancestors had done for centuries, handing down their art from father to son; they took to the business of raising indigo, as their soil and climate were well adapted to its production and the demand was good.

Yet there are some of them weaving at this day, though not in sufficient numbers to produce the muslin as a regular article of commerce. A bamboo bow strung with catgut, like a fiddle string, is used to separate the fiber from the seed. It is carded with a big fishbone. The distaff is held in the hand and the loom is a very old-fashioned affair, home-made of bamboo reeds, so simple that a few shillings will purchase one, though a lifetime will not make one able to use it.

The weaver chooses a spot under the shade of a large tree, digs a hole in the dirt for his legs and the lower part of the "geer" and fastens his balances to some convenient bough overhead. His exceedingly fine threads will not work well except in such a shady spot and early in the morning, when there is just the right amount of moisture in the tropical air. There is no line of hand work in which there is such a contrast to-day as in the business of making cotton goods. Machinery has vastly outstripped the hand in quantity of product and accuracy, yet the old ways prevail in the manipulation of the very finest of web. Although Whitney's saw gin made a revolution in the industry, yet the long and delicate fibers of sea-island cotton are separated from the seed in the old way of passing seed cotton between two rollers which are going in different directions. The smooth seeds of this cotton pop away from the fiber quite readily without breaking it. If it were pulled through Whitney's gin there would be more or less tearing and breaking. So the great invention does not apply to cleaning the very finest material. The short wool fibers of common cotton are not so much hurt by the saw teeth and the amount of work done by the gin makes this damage of no account.

At the Atlanta Cotton Exposition in 1882 the old and the new were strikingly contrasted. The mountain people of the South, in many instances, live after the old fashions of colonial times. They make homespun cloth which is a revelation to us. Some of these people were induced to show their work at the exposition, and they were as much astonished at the apparel of their visitors who gazed upon them and their strange labor as were the visitors at the work and manners of the mountaineers.

Two carders operated hand cards, two spinsters ran the spinning-wheels and one weaver made cloth upon a hand loom. In ten hours these five people made eight yards of very coarse cloth.

THE CINNAMON TEAL.

(*Anas cyanoptera.*)

DAVIE says that the geographical distribution of this beautiful teal is western America, from the Columbia river south to Chili, Patagonia, and Falkland Islands; east in North America to the Rocky Mountains; casual in the Mississippi Valley, and accidental in Ohio. It is abundant in the United States west of the Rocky Mountains, breeding in Colorado, Utah, Nevada, California, Idaho, and Oregon. Its habits are similar to those of the blue-wing. Its favorite breeding-places are in fields of tall grass or clover, not far from water. The eggs range from nine to thirteen, and the nest is so completely woven of grass, feathers, and down that it is said the entire structure may be picked up without its coming apart. Oliver Davie, the well known ornithologist, says that it gave him pleasure to be able to add this beautiful duck to the avifauna of Ohio as an accidental visitor. On the 4th of April, 1895, a fine male of this species was taken at the Licking County reservoir by William Harlow. On the 6th Mr. Davie skinned and mounted it and it is now one of the rare Ohio birds in his collection. It proved to be good eating. This, he says, is the first record of the cinnamon teal ever having been taken in the state.

The eggs of this species are creamy-white or pale buff, the average size being 1.88x1.38.

A SCRAP OF PAPER.

ELANORA KINSLEY MARBLE.

"A bluebird sings on the leafless spray,
Hey-ho, winter will go!"

HE ARRIVED that year very early in the season. It was about the twelfth of February that I first heard his plaintive note far up in the maple tree. Could it be Mr. Bluebird, I questioned as I hastened to the window opera-glass in hand? Yes, there he stood, not too comfortably dressed I am afraid, in his blue cap, sky-blue overcoat and russet-brown vest edged with a trimming of feathers soft and white.

There had been a slight fall of snow during the night, and I fancied, from his pensive note, that he was chiding himself for leaving the Mississippi Valley, to which he had journeyed at the first touch of wintry weather in Illinois.

"If it wasn't for the snowdrops, the crocus, the violets, and daffodils," he was saying in a faint sweet warble, "I'd linger longer in the South than I do. They, dear little things, never know, down in their frozen beds, that winter will soon give place to spring till they hear my voice, and so, no matter how bleak the winds or how gray the sky, I sing to let them know I have arrived, my presence heralding the birth of spring and death of winter. It well repays me, I am sure, when, in March under the warm kisses of the sun their

pretty heads appear above the ground, and, smiling back at him, out they spring dressed in their new mantles of purple and yellow."

At this moment from the topmost branch of an adjoining maple came a low, sweet, tremulous note very much indeed like a sigh.

"Ah," said he, surveying the newcomer with flattering attention, "that is the young daughter of Mr. and Mrs. Bluebird who nested in Lincoln Park last summer. For some reason they decided not to go South this season but remained in Chicago all winter. She strikes me as being a very pretty young-lady bird, and certainly it will be no more than friendly upon my part to fly over there and inquire how she and her family withstood the rigors of a Northern winter."

From Miss Bluebird's demeanor, when he alighted upon a twig beside her, I concluded she greatly disapproved of his unceremonius approach. Prettily lifting her wings and lightly trembling upon her perch she made as if to fly away, but instead only changed her position a little, coyly turning aside her head while listening to what the young gentleman had to say.

Encouraged by this Mr. Bluebird's manner became very friendly indeed, and very soon, reassured by his respectful demeanor and sentiments uttered in a voice of oh, such touching sweetness, the young-lady bird unbent, responding at length in a very amiable manner, I noticed, to her companion's remarks.

The conversation which followed may have been very commonplace or very bright and sparkling, but as there is always an undercurrent of sadness in the bluebird's note, and an air of pensiveness expressed in its actions, one could only conjecture what the tenor of this one might be.

The pair, to my intense satisfaction, the next day met again in the top of the maple tree exchanging confidences in low, tremulous strains of surpassing sweetness, uneasily shifting their stations from time to time, lifting their wings, as is their pretty habit, and trembling lightly upon their perches as though about to rise and fly away.

The following morning, which was the fourteenth day of February, Mr. Bluebird's manner when he greeted his new acquaintance appeared to offend her very much. She was cold and distant, whether from maidenly coyness or a laudable desire to check his too confident, proprietorship sort of air, who can say? In no way daunted, that gay bachelor pressed his suit warmly, picturing in tones of peculiar tenderness the snug little home they would establish together, what a devoted husband he would be, attentive, submissive, following her directions in all things. Miss Bluebird shook her head.

It was all very well, she replied, for him to talk of poetry and romance, but he knew well enough that upon her would devolve all the serious cares of life. While he would be very active in hunting for tenements, submitting, no doubt, to her choice, was it not the custom of all the Mr. Bluebirds to fly ahead in quest of material, gayly singing, while their mates selected and carried and builded the nest? What poetry would there be in life for her, she would like to know, under such circumstances, and then, when all was done, to sit for hours and days on the eggs she had laid in order to rear a brood. Oh, no! She was not ready to give up all the pleasures of life yet, and then—and then—Miss Bluebird lowered her eyes and stammered something about being too young to leave her mother.

What argument Mr. Bluebird brought to bear against this latter reason for rejecting his suit I cannot say, but being a wise bird he only stifled a laugh behind his foot and continued more warmly to press it. Again and again he followed her when she took a short flight, quavering *tru-al-ly*, *tru-al-ly*, no

doubt telling her of the many good qualities of the Mr. Bluebirds, how devoted they were, how they ever relied upon the good judgment and practical turn of their mates, never directing, never disputing, but by cheerful song and gesture encouraging and applauding everything they did. Then, too, unlike some other husbands that wear feathers, they regularly fed their mates when sitting upon the nest and did their duty afterward in helping to rear the young.

As he talked Miss Bluebird's coldness gradually melted till at length she coyly accepted his invitation to descend and examine a certain tenement which, hoping for her acceptance, he had the day previous, he said, been to view.

"We can at least look it over," he said artfully, noticing the elevation of her bill at the word "acceptance," "though of course it is too early in the season to occupy it. Mr. Purple Martin lived in it last year and——"

Miss Bluebird interrupted him, a trifle haughtily, I thought.

"Is the tenement you speak of in a stump, fence hole, or tree cavity?" she inquired.

"Neither," he hastened to answer; "it is a box erected by the owner of these premises."

"Ah," said she, graciously, "that is another matter," and very amiably spread her wings and descended upon the roof of the box in question.

"You see," explained Mr. Bluebird, "the man who put up this dwelling knew what he was about. He had no intention the sparrows should occupy it, so he built it without any doorsteps or piazza, as you have no doubt remarked."

"Really," replied Miss Bluebird, "in my opinion that is a great defect. A house without doorsteps——"

"Is just what certain families want," interrupted Mr. Bluebird, smilingly. "Our enemies, the sparrows, cannot fly directly into a nest hole or box like this, as we can, but must have a perch upon which first to alight. It is for that reason, my dear, this house was built without doorsteps. No sparrow families are wanted here."

Miss Bluebird at this juncture thought it proper to be overcome with a feeling of shyness, and could not be prevailed upon to enter the box.

More than once her companion flew in and returned to her side, singing praises of its coziness as a place of abode.

"With new furnishings it will do capitally," said he; "we might even make the Purple Martins' nest do with a little——"

Miss Bluebird's bill at once went up into the air.

"If there is anything I detest," said she, scornfully, "it is old furniture, especially second-hand beds. If that is the best you have to offer a prospective bride, Mr. Bluebird, I will bid you good-day," and the haughty young creature prettily fluttered her wings as if about to fly off and leave him.

"Do not go," he pleaded; "if this house does not please you I have others to offer," and Miss Bluebird, moved apparently by his tender strains, sweetly said *tru-al-ly* and condescended to fly down and enter the box.

It was scarcely a minute ere she reappeared, and, flying at once to her favorite branch in the maple tree, called to him to follow. A scrap of paper, woven into his nest by the Purple Martin the past season, fluttered to the ground as she emerged from the box, and while the pair exchanged vows of love and constancy up in the maple tree, I picked it up and saw, not without marveling at the sagacity of Mr. Bluebird, who probably had dragged it into sight, a heart faintly drawn in red ink, and below it the words:

"*Thou art my valentine!*"

THE CLAPPER RAIL.

(*Rallus longirostris crepitans.*)

THIS bird, sometimes called the salt-water marsh hen, is found in great abundance in the salt marshes of the Atlantic coast from New Jersey southward. It breeds in profusion in the marshes from the Carolinas to Florida, and has lately been found breeding on the coast of Louisiana on the Gulf of Mexico, Dr. A. K. Fisher having taken an old bird and two young at Grand Isle in 1886. The clapper rail arrives on the south-eastern coast of New Jersey about the last of April, its presence being made known by harsh cries at early dawn and at sunset. Nest-building is commenced in the latter part of May, and by the first of June the full complement of eggs is laid, ranging, says Davie, from six to nine or ten in number, thirteen being the probable limit. Farther south the bird is known to lay as many as fifteen. On Cobb's Island, Virginia, the clapper breeds in great numbers, carefully concealing the nest in high grass. The color of the eggs is pale buffy-yellow, dotted and spotted with reddish-brown and pale lilac, with an average size of 1.72x1.20, but there is a great variation in this respect in a large series.

At the nesting-season the rails are the noisiest of birds; their long, rolling cry is taken up and repeated by each member of the community. The thin bodies of the birds often measure no more than an inch and a quarter through the breast. "As thin as a rail" is a well-founded illustrative expression.

"To get a good look at these birds in their grassy retreats," says Neltje Blanchan, "is no easy matter. Row a scow over the submerged grass at high-tide as far as it will go, listen to the skulking clatterers, and, if near by, plunge from the bow into the muddy meadow, and you may have the good fortune to flush a bird or two that rises fluttering just above the sedges, flies a few yards, trailing its legs behind it, and drops into the grasses again before you can press the button of your camera. A rarer sight still is to see a clapper rail running, with head tilted downward and tail upward, in a ludicrous gait, threading in and out of the grassy maze."

The rail can swim fairly well, but not fast. Its wings are short, but useful, and it is so swift-footed that dogs chase it in vain.

THE SWINGING LAMPS OF DAWN.

REV. CHARLES COKE WOODS.

Anear the threshold of my home
A wily foe had strayed,
And on a rose-tree in the loam
A wondrous thing he made;
Beneath the cover of the night
He built a silken gin,
And at the break of morning light
Bade all the homeless in.

Each shining cord was made with skill,
And woven with such grace,
That none would dream he meant to kill,
In such a royal place;
The beauty of that bright bazar
No one could ever fear,
Its mirrors caught the morning star,
That glistened crystal-clear.

Its swinging lamps were globes of dew,
Enkindled by the dawn,
And when the morning breezes blew
Across the velvet lawn,
The shining lamps swung to and fro.
Enravishing the eye,
Till garbed in light-robes, all aglow,
Was every flower and fly.

But when the lights began to wane,
As sea-tides slowly ebb,
I heard the minor notes of pain
Issuing from a web;
And as my cautious feet drew nigh,
I heard the dying song
Of one deluded, wayward fly
That watched the lamps too long.

FROM COL. F. NUSSBAUMER & SON
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07

CLAPPER RAIL.
2/5 Life-size.

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THE LATE DR. ELLIOTT COUES.

C. C. MARBLE.

THE subject of this sketch, whose death occurred on Christmas, 1899, at Baltimore, Md., was one of the few men who have become famous both in physical and psychical science. He had long been recognized as one of the leading naturalists of America, and of late years had acquired equal distinction as a philosopher.

Early in April last Dr. Coues supplied us with the material for a sketch of his life, to which we are indebted chiefly for what this article contains. He was born in Portsmouth, N. H., Sept. 9, 1842, and was the son of Samuel Elliott Coues and Charlotte Haven Ladd Coues. His father was the author of several scientific treatises which anticipated some of the more modern views of physics, astronomy, and geology; so that young Coues would seem to have inherited his bent of mind towards study and research. The name is of Norman French origin. Dr. Coues' father was a friend of Franklin Pierce, and early in the presidency of the latter received from him an appointment in the United States patent office, which he held nearly to his death in July, 1867. The family moved to Washington in 1833 and Dr. Coues had always been a resident of that city, excepting during the years he served in the West and South as an army officer or engaged in scientific explorations. As a boy he was educated under Jesuit influences at the seminary now known as Gonzaga College. In 1857 he entered a Baptist college, now Columbian University, where he graduated in 1861 in the academic department, and in 1863 in the medical department of that institution. To the degrees of A. B., A. M., Ph. D., and M. D., conferred by this college, his riper scholarship added titles enough to fill a page from learned societies all over the world.

His taste for natural history developed early in an enthusiastic devotion to ornithology, and before he graduated he was sent by the Smithsonian Institution to collect birds in Labrador. Among his earliest writings are the account of this trip, and a treatise on the birds of the District of Columbia, both published in 1861, and both papers secured public recognition in England as well as in this country, thus making a beginning of his literary reputation.

While yet a medical student, Dr. Coues was enlisted by Secretary Stanton as medical cadet, U. S. A., and served a year in one of the hospitals in Washington. On graduating in medicine in 1863, he was appointed by Surgeon-General Hammond for a year as acting assistant surgeon U. S. A. and, on coming of age passed a successful examination for the medical corps of the army. He received his commission in 1864, and was immediately ordered to duty in Arizona. His early years of service in that territory, and afterward in North and South Carolina, were utilized in investigating the natural history of those regions, respecting which he published various scientific papers.

Though he wrote some professional articles, during his hospital experience, Dr. Coues seems never to have been much interested in the practice of medicine and surgery. After about ten years of ordinary military service as post surgeon in various places he was, in 1873, appointed naturalist of the U. S. northern boundary commission, which surveyed the line along the forty-ninth parallel from the Lake of the Woods to the Rocky mountains. In 1874 he returned to Washington to prepare the scientific report of his operations. He edited all the publications of the United States geological and geographical survey of the territories from 1876 to 1880 and contributed several volumes to the reports of the survey, notably his "Birds of the Northwest," "Fur Bearing Animals," "Birds of the Colorado Valley," and several installments of a universal Bibliography of Ornithology. The latter work attracted especial attention in Europe, and Dr. Coues was signally complimented by an invitation, signed by Darwin, Huxley, Flower, Newton, Sclater, and about forty other leading British scientists to take up his residence in London and identify himself with the British Museum.

Dr. Coues also projected and had well under way a "History of North American Mammals," which was ordered to be printed by act of Congress when suddenly, at the very height of his scientific researches and literary labors, he was ordered by the war department to routine medical duty on the frontier. He obeyed the order and proceeded to Arizona, but found it, of course, impossible to resume a life he had long since outgrown. His indignant protests being of no avail he returned to Washington and promptly tendered his resignation from the army in order to continue his scientific career unhampered by red tape.

As an author he is chiefly known by his numerous works on ornithology, mammalogy, herpetology, bibliography, lexicography, comparative anatomy, natural philosophy, and psychical research. He was one of the authors of the Century Dictionary of the English Language, in seven years contributing 40,000 words and definitions in general biology, comparative anatomy, and all branches of zoölogy. During the last few years he contributed several volumes on western history, in all twelve volumes, and by study and research was enabled to correct many errors. In 1877 he received the highest technical honor to be attained by an American scientist in his election to the Academy of National Science and was for some years the youngest academician. The same year saw his election to the chair of anatomy of the National Medical College in Washington, where he had graduated in '63. He then entered upon a professorship and lectured upon his favorite branch of the medical sciences for ten years. He appears to have been the first in Washington to teach human anatomy upon the broadest basis of morphology and upon the principle of evolution. Nearly all his life Dr. Coues has been a collaborator of the Smithsonian Institution of Washington, his name being most frequently mentioned in that connection. Many of the numberless specimens of natural history he presented to the United States government were found new to science and several have been named in compliment to their discoverer.

At the height of his intellectual activity in physical science the spiritual side of Dr. Coues' nature was awakened. He became interested in the phenomena of spiritualism, as well as in the speculations of theosophy. Belonging distinctively to the materialistic school of thought and skeptical to the last degree by his whole training and turn of mind, he nevertheless began to feel the inadequacy of formal orthodox science to deal with the deeper problems of human life and destiny.

Convinced of the soundness of the main principles of evolution, as held by his peers in science, he wondered whether these might not be equally applicable to psychical research, and hence took up the theory of evolution at the point where Darwin left it, proposing to use it in explanation of the obscure phenomena of hypnotism, clairvoyance, telepathy and the like.

He visited Europe to see Mme. Blavatsky, founded and became president of the Gnostic Theosophical Society of Washington, and later became the perpetual president of the Esoteric Theosophical Society of America. In 1890 he published an exposé of the impostures of Blavatsky, and from that time his interest in the cult gradually ceased.

Most men can do some things well, but nature is seldom so lavish of her gifts as to produce a genius who does all things equally well. It is rare to find a man like Dr. Coues, who was capable of incessant drudgery in the most prosaic technicalities, yet blessed with the poetic temperament and ardent imagination, able to array the deepest problems in a sparkling style which fascinated while it convinced. His literary labors would have killed most men, but to his grasp of mind nature had kindly joined a strong, healthy body that proved capable of any demand upon his physical endurance that his intellectual activity might make. He was tall, well-formed, classic in features, straight as an arrow, with the air of the scholar without the student's stoop, betraying no trace of mental weariness—a man with the tastes of a sybarite and the soul of a poet; to quote from a leading journal, "the imagination of a Goethe and the research of a Humboldt."

In conversation he was fascinating, possessing much of the personal magnetism ascribed to James G. Blaine. It was the pleasure of the writer to have many interviews and to enjoy a somewhat intimate correspondence with him almost up to the time of his death.

BOBBY'S "COTTON-TAIL."

GRANVILLE OSBORNE.

I.

Name's Bobby Wilkins; I'm a-goin' on six years old;
Aunt Polly says 'at I'm a-gettin' purty pert 'n bold;
She 'aint er might uv use fer boys 'at's jest er-bout my size;
If Tabby'n me hev eny fun her "angry pashuns rise," 'n
When I try ter make some sparks fly out uv Tabby's tail
Aunt Polly says, "Bad boys like you are sometimes put in jail;"
But I don't mind her not a bit, an' make jest lots uv noise,
An' nen she looks so cross an' sez, "Deliver me frum *boys*."

II.

My Aunt Polly likes her cat er-nough sight better'n me, 'n'
Keeps a-coddlin' it 'ith cream 'n' sometimes catnip tea.
Seen some tracks behin' ther shed, an' nen I sez, sez I,
"I'll catch yer, Mister Cotton-Tail, to make a rabbit pie;"
So me'n' Tommy Baker found er empty cracker box;
Thought we'd hev it big er-nough fer fear he wuz er fox,
An' nen we propped ther cover up 'n' fixed it 'ith a spring
'At shut it suddin' 'ith a bang ez tight ez anything.

III.

We cut er fresh green carrot top 'n' put it in fer bait,
Wuz both so sure we'd ketch him 'at we couldn't hardly wait;
Pounded in some stakes each side 'n' made it good 'n' stout;
If Mister Cotton-Tail got in he never could get out.
Tom staid 'ith me till mornin', an' almos' 'fore it wuz light
We run behin' ther shed 'n' foun' our trap all shet up tight;
An' nen I shouted, "Got him!" 'n' Tom threw up his hat—
Blame 'f that ol' rabbit wasn't my Aunt Polly's cat!

"THE COUNTRY, THE COUNTRY!"

FROM A CLUB OF ONE, BY A. P. RUSSELL, L. H. D.*

TREES! Think of them! In the United States thirty-six varieties of oak, thirty-four of pine, nine of fir, five of spruce, four of hemlock, two of persimmon, twelve of ash, eighteen of willow, nine of poplar, and I don't know how many of the beautiful beech. I once counted over thirty different varieties of trees in the space of one acre. And the leaves—their number, their individuality, their variety of shape and tint, the acres of space that those of one great tree would cover if spread out and laid together! In the autumn to watch them fall—how slowly, how rapidly! Yet they say nobody ever saw one of them let go. Homer's comparison to the lives of men—how fine! Better than Lucian's to the bubbles. I remember very well one October day in Ohio. It was long ago—"in life's morning march, when my bosom was young." (I like to quote from that poem of Campbell's, it is incomparable of its kind.) A delightful tramp! Elderberries. (The great Boerhaave held the elder in such pleasant reverence for the multitude of its virtues, that he is said to have taken off his hat whenever he passed it.) Grapes. Haws. Pawpaws. (Nature's custard.) Spicewood. Sassafras. Hickory nuts. Nearly a primeval forest. Vines reminding one of Brazilian creepers. Trees that were respectable saplings when Columbus sailed. The dead roots of an ironwood—so like a monster as to startle. Behemoth I thought of. "He moveth his tail like a cedar.' Thistle-down. Diffused like small vices. Every seed hath wings. Here and there a jay, or a woodpecker. Grape-vines, fantastically running over the tops of tall bushes, grouping deformities, any one of which, if an artist drew it, would be called an exaggeration, worse than anything of Doré's. Trees, swaying and bowing to one another, like stilted clowns in Nature's afterpiece of the seasons. Trees incorporated, sycamore and elm, maple and hickory, modifying and partaking each other's nature; resembling so much as to appear one tree. A jolly gray squirrel, hopping from limb to limb, like a robin; swinging like an oriole; flying along the limb like a weaver's shuttle; scared away, at length, by a scudding cloud of pigeons, just brushing the tallest tree-tops, as if kissing an annual farewell. Clover. Sorrel. Pennyroyal. A drink of cider from a bit of broken crockery. ("Does he not drink more sweetly that takes his beverage in an earthen vessel than he that looks and searches into his golden chalices for fear of poison, and sleeps in armor, and trusts nobody, and does not trust God for his safety?" ."All is fair—all is glad—from grass to sun!" Not a "melancholy" day. Keats' poem on Autumn comes to mind; and Crabbe's

"Welcome pure thoughts, welcome, ye silent groves;
These guests, these courts, my soul most dearly loves."

Indian summer. Balzac's comparison to ripe womanhood. The significant worn walk round the mean man's field; its crooked outline impressively striking. All in all, a white day. Memory of it supplies these notes. They might be expanded into an essay. The country, the country! Though the man who would truly relish and enjoy it must be previously furnished with a large and various stock of ideas, which he must be capable of turning over in his own mind, of comparing, varying, and contemplating upon with pleasure; he must so thoroughly have seen the world as to cure him of being over fond of it; and he must have so much good sense and virtue in his own heart as to prevent him from being disgusted with his own reflections, or uneasy in his own company. Alas!

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LAWRENCE, MASS.

FROM COL. F. KAEMPFER.
R. MUMFORD, PUBLISHER CHICAGO.

GOPHER.

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THE GOPHER.

THE name of gopher, according to Brehm, is applied in some American localities to various other widely variant rodents. The zoölogists, who first described the animal, obtained their specimens from Indians, who had amused themselves by cramming both cheek pouches full of earth, distending them to such a degree that if the animal had walked the pouches would have trailed on the earth. These artificially distended pouches obtained for the gopher its name; the taxidermists who prepared the dead specimens endeavored to give them what was supposed to be a life-like appearance by following the practice of the Indians in distending the cheek pouches, and the artists who delineated the animal followed the models which were accessible to them, but too truly in their drawings. Owing to these circumstances, the pictures of gophers of even recent date represent really monstrous animals, when they honestly intend to familiarize us with the gopher.

The gopher may be found east of the Rocky Mountains and to the west of the Mississippi river, between the thirty-fourth and fifty-second parallel of north latitude. It leads an underground life, digging tunnels in various directions. Tunnels, of old standing, says Brehm, are packed hard and firm from constant use. Lateral passages branch off at intervals. The main chamber is situated under the roots of a tree at a depth of about four and one-half feet; the entrance tunnel is sunk down to it with a spiral direction. This chamber is large, is lined with soft grass, and serves for a nesting and sleeping-place. The nest in which the young, numbering from five to seven, are born about the beginning of April, is lined with the hair of the mother. It is surrounded with circular passages from which the tunnels radiate. Gesner found that a passage leads from the nest to a larger hole, the storeroom, which is usually filled with roots, potatoes, nuts, and seeds. When throwing up the earth the gopher exposes itself to view as little as possible and immediately after accomplishing its purpose plunges back into its hole. According to Audubon it appears above ground to bask in the sun. We have seen it sit at the entrance to its den with an air of bold indifference to the approach of danger and then suddenly vanish under ground. Its acute sense of hearing and great power of scent protect it from surprises.

Audubon kept several gophers in captivity for months, feeding them on potatoes. Their appetites were voracious, but they would drink neither water nor milk. They made incessant efforts to regain their liberty by gnawing through boxes and doors. They constantly dragged clothing and other similar objects together, utilizing them as bedding, first gnawing them to pieces. One of them, straying into a boot, instead of turning back, simply gnawed its way through the tip. The habit of gnawing was unendurable and Audubon incontinently got rid of them.

The gopher is very destructive to valuable trees and plants, for which reason man is its most dangerous enemy, the only other foes it has to fear being water and snakes.

This pretty little rodent is often found in populous neighborhoods. A few years ago the writer saw one rush into a hole under the root of a large osage orange bush in Woodlawn, Chicago. Curiosity led him to watch for the reappearance of the animal, which soon put its head cautiously above the entrance and eyed the intruder with as much interest as a weasel will often show under like circumstances. For several weeks the gopher was visible in the morning hours. We pointed it out to several persons, each of whom declared it to be a ground squirrel. There is a great difference in these small animals, but they are frequently confounded.

The name of gopher is applied in some American localities to various other rodents.

HANS AND MIZI.

DR. ALBERT SCHNEIDER.

HANS was a little blue-eyed German orphan who had been "adopted" by a man and wife because they thought they could make good use of him; but to their chagrin they were disappointed. Hans had been told again and again that he was an ungrateful, lazy, good for-nothing. This was also the reason why his master whipped him so frequently. Now Hans was only nine years old and, of course, he could not know that he was so thoroughly bad unless he was told and the telling of it accompanied by cuffs, in order to impress this fact more fully upon his dull brain.

It was really true that Hans was lazy and perhaps queer in many ways. He disliked hard work, preferring to wander about the fields and meadows, the ditches, pastures, and the trees of the nearby forest. He had been discovered lying in the grass watching the fleeting clouds overhead and listening to the sighing of the wind in the tall grass and the overshadowing trees. In his imagination the breezes whispered soothing words, soft and low. He watched the busy bees, the ants, and the black carrion beetles tugging great loads up hill.

Often he had observed a lady with two children about his age going by on their way to Sunday-school. With wistful eyes he would watch the romping of the children and listen to their exclamations of joy as they played among the flowers. Sometimes the kind lady would beckon to Hans and talk kindly to him and make him presents. Then little Hans would cry as though his poor heart would break. He hid the gifts in a secret nook in the granary which was also his sleeping place and often he would think of the kind lady and her happy children while the love-hunger shone in his eyes.

Mizi was only a half-starved, homeless, gray kitten which came to Hans while he was hoeing in the orchard. The two understood each other at once, and why should they not? Both were homeless, friendless, and soulless. Everybody knows that a cat, much less a stray kitten, has no soul. You may say that Hans was neither a cat nor a kitten, but some little boys of the neighborhood had sneeringly remarked that he was a "fraid-cat." Besides, his master had whipped all the spirit out of him. Therefore he, too, was without a soul. Hans petted Mizi and gave her some bread-crusts and hid her in the shed to keep her out of sight of his master. Mizi gained in flesh and became very fond of Hans, and at times would try to follow him, but Hans would take her back and put her in a more secure place. Mizi did not know of the cruel master and in spite of all precautions she finally made her escape and searched for Hans. She could not find him, so she mewed again and again and finally succeeded in attracting, not only the attention of Hans but also that of the master who promptly picked up a stone and hurled it at Mizi but fortunately missed her. It may be that Mizi was not so easily frightened as Hans, for in time she tried to get to him even if the master was near. Poor, ignorant Mizi, she did not know that this show of friendliness would get Hans into trouble. The master concluded that Hans was responsible for the presence of Mizi and ordered him to take her and kill her then and there. In agony and despair Hans ran to Mizi to frighten her away but she only rubbed her glossy fur against him and purred gently and only when the frenzied master attempted to grasp her out of the protecting arms of Hans did she attempt to flee—but too late! a vicious kick caught her in the side but she managed to escape under the protecting granary. In the evening Hans went to the shed and called "Mizi, Mizi," and poor, suffering Mizi dragged herself far enough so that little Hans might stroke her head. Hans brought some bread and milk but Mizi only mewed piteously. In the morning Hans found Mizi stiff and cold near the opening of the shed. Poor Hans, he sobbed and sobbed and called, "Mizi, Mizi," most piteously but Mizi did not answer; her sufferings were over.

GEOGRAPHY LESSONS.

IT IS possible for a pupil to study geography diligently every day and forget apparently nearly everything he learns. Both geography and history are studies which may be pursued in such a way that nearly all that is acquired in any given month is lost in the next month. Those who are inclined to doubt this have but to test a class where the text has been the subject of acquisition. Test them on what they learned a month previously and even those inclined to believe this statement will be astonished that so little is retained of what once seemed to be known so well.

Mr. A sweeps his barn with the doors open and the wind blowing against his work. He works with much energy and some apparent efficiency; but the wind brings back the chaff to such an extent that there is never much clear space on his floor. Mr. B takes advantage of the direction of the wind, and every stroke counts for success and is more than doubled in effect by the help of the wind. The chaff flies before him and his floor is clear in a short time.

I have seen a steamer in waters opening upon the Bay of Fundy pouring out black smoke, beating the water into foam, and apparently making great progress. But observation of the distant shore proved that she was actually standing still. The adverse tide was such that she could not contend with it successfully. So she dropped her anchor and saved coal and the wear of machinery. Two hours later she swung with her cable, the anchor was hoisted, and she moved rapidly in the desired direction without the aid of a pound of steam. In Passamaquoddy bay are so many islands and channels and such a great fluctuation of tide that the waters are racing in various directions at all times. Fishermen study their courses and never tack against the tide. Those who go out every day do not leave home at the same hour Tuesday as on Monday, but just fifty minutes later. They do not go and return over the same courses, for many times the strongest flow of tide does not run where there was the swiftest ebb. With them the proverb, "The longest way round is the shortest way home," is often true, and I have heard them quote those words frequently.

In psychology there are both a wind and a tide. The wind is what the pupil thinks of the subject—as to its usefulness in his future life. The tide is his natural interest in the thing for its own sake.

Wind and tide are sometimes both against us, and it is a poor skipper who lacks the sense to tie up for a short time or take another course when he finds both set against him.

But there are teachers who battle fiercely against the desires and interests of their pupils, bound to compel them to learn, making a tremendous fuss, filling families with tears and tremblings, threatenings, scoldings, and reviewings—all with no permanent results of value.

There is a natural interest in children for birds. It is so strong and absorbing that it amounts to a psychological tide. The things of the bird-world act upon the child-mind rather instinctively than mentally. The whole child is active and alert when the subject is such that it fully interests him. A little effective teaching just at that time is worth more than hours of perfunctory drudgery over a similar task presented in the wrong way.

There are birds wherever man lives. They differ in color, form, and habit according to environment. The pupil who seems to be interested least in the ordinary things of the text book in geography is the very one, as a rule, to be caught with the birds and animals of the various parts of the earth. The pupil who will not retain information about the products of a country may be induced to consider intelligently something about the fauna of that country and pass readily to an interested study of the flora, and from what grows there to what is shipped from that place.

THE MINK.

(*Putorius visan.*)

THIS soft fur bearing animal has been described by Audubon and Prince De Wied. Its nearest relatives are very closely allied to the polecat and differ from it only by a flatter head, larger canine teeth, shorter legs, the presence of webs between the toes, a longer tail, and a lustrous fur, consisting of a close, smooth, short hair, resembling otter fur. Its color is a uniform brown. The fur of the American mink is much more esteemed than that of the European, as it is softer and of a more woolly character.

According to Audubon the mink ranks next to the ermine in destructive capacity, prowling around the farmyard or duck-pond, and its presence is soon detected by the sudden disappearance of young chickens and ducklings. Audubon had a personal experience with a mink which made its home in the stone dam of a small pond near the home of the naturalist. The pond had been dammed for the benefit of the ducks in the yard, and in this way afforded the mink hunting-grounds of ample promise. Its hiding-place had been selected with cunning, very near the house and still nearer the place where the chickens had to pass on their way to drink. In front of its hole were two large stones, which served the mink as a watch tower, from which it could overlook the yard as well as the pond. It would lie in wait for hours every day and would carry away chickens and ducks in broad daylight. Audubon found the mink to be especially plentiful on the banks of the Ohio river, and there observed it to be of some use in catching mice and rats. But it was also addicted to poaching and fishing. The naturalist observed it to swim and dive with the greatest agility and pursue and attack the quickest of fishes, such as the salmon and trout. It will eat frogs or lizards, but when food is plentiful it is very fastidious, preying upon rats, finches and ducks, hares, oysters and other shell fish; in short, Brehm says it adapts itself to the locality and knows how to profit by whatever food supplies it may be able to find. When frightened it gives forth a very fetid odor like the polecat.

The female gives birth to five or six young at about the end of April. If taken young they get to be very tame and become real pets. Richardson saw one in the possession of a Canadian lady who used to carry it about with her in her pocket. It is easily caught in a trap of any kind, but its tenacity of life renders it difficult to shoot. The European mink much resembles the American, except that it is somewhat smaller and its fur is coarser.

Upon a large farm in Michigan visited by the writer this summer ran a creek where the chickens, when the trough was dry—and dry it usually was—traveled to get a drink. In the bank of the creek a mink made his home, and not a week passed that one or more hens did not appear in the barnyard crippled or mangled in a manner painful to behold—painful, that is, to the visitor, but not apparently to the farmer, who only said: "It's that darned mink; some day, when I have time, I'll set a trap and catch him," and so went coolly on his way, leaving the poor maimed creatures to drag out a painful existence for days or weeks, hoping that nature would heal the wounds made by the mink.

Aside from the lack of thrift thus shown by the farmer—for the hens, when badly mangled, in time succumbed—the inhumane aspect of the case never seemed to strike him. The cultivation of his fields left no time for cultivating the finer feelings of the heart.

Public Library,

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A. W. MUMFORD, PUBLISHER, CHICAGO.

MINK.

4/11 Life-size.

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THE NEW SPORT.

JOHN WINTHROP SCOTT.

IN THE early days every man and boy knew how to use a gun. It was a necessity of life. It brought in meat for the family. The regular business of every holiday was to go to the woods and kill. The free life of the woods, the pleasure of ranging about for a purpose, and the excitement attending success in bagging game were among their greater pleasures.

Now we live in cities mainly. Even the country boy has less regard for the gun. The game and many of the birds and animals that are not game have been killed off, so that country boys now wish to give them a chance for their lives. Probably the worst murderers of songsters and innocent animals are the ignorant city youths who get only a day or two in the woods in a year.

Guns have been "improved" to such an extent that whether the gunner has any skill or not everything in sight can be killed because of the rapidity of fire and the number of chances for killing. A gun has been invented which pours a steady stream of rapid fire as long as you hold the trigger. It was invented for killing men on the battlefield; but there are other guns nearly as destructive that are used for "sport."

Public schools, Audubon societies, women's clubs, and other humanizing agencies have so modified the ideas of boys and young men that there are but few who hunt for sport.

The cheapening of the camera and its perfection for amateur use have placed a new shooting apparatus in their hands, and many young people of both sexes are now more or less expert in making exposures and developing. A shot with a camera is worth more than a shot with a gun. You have to eat or stuff the unfortunate bird or animal you shoot with a gun. When it is gone you have nothing to show for your skill.

The shot with a camera gives you a handsome picture with many thrilling details to relate. If you wish to boast you have the evidence at hand to corroborate your statement. The pictures last indefinitely, are easily stored, and may be duplicated at will.

Camera presents last Christmas far outnumbered the guns given. Boys and girls much prefer the new sport to the old. With the aid of the bicycle in getting about the country, young people are making trips to the country with loaded cameras and bringing in much more satisfactory game than they used to get with guns.

The skill some of them have manifested in getting a focus on some shy resident of the woods or fields is indeed remarkable. Imitations of brush heaps are made out of light stuff that may easily be carried about. These may be placed before the residence o a rabbit or woodchuck for several days before the attempt is made to get a shot from beneath. A great deal of caution is sometimes necessary to get the subject accustomed even to a strange brush heap, so he will act naturally at the instant the snap is made.

Two young Englishmen made a mock tree-trunk of cloth, painted its exterior, cut holes in it for observation and for the camera, tricked it out with vines, spread it out on a light frame so they could set it up where they chose, and got so many beautiful and scientifically interesting views that they have written a book that has had a large sale. It is embellished with half-tone engravings made from their collections of photographs, and is a most delightful and useful addition to one's library. It is entitled "Wild Life at Home," and is published by Cassell & Company of New York. It has met with such popularity largely because it has appeared just at the time when so many young people are turning their attention from the killing of birds and animals to the more pleasing and humane business of catching their likenesses in their native haunts.

Dr. R. W. Shufeldt, of Washington, a distinguished naturalist, has made many photographs of wild life in the United States, and embellished his own works with reproductions of these pictures which are so very interesting and difficult to secure.

The telephoto lens is a great help in taking the more timid subjects. Audubon used a telescope to get the most familiar glimpses of these little inhabitants of the forests long before the dry plate was invented. What would he not have given to have been the possessor of a means of taking instantly all the details and attitudes of the wild birds he loved so well!

The camera is now adding daily to the accurate knowledge we possess of the things of nature, and every young person should own one and become familiar with its rare qualities and usefulness. It is very gratifying to think that sport in the woods now means something superior to the old bloody work our boys formerly pursued with guns. With a copy of the book above mentioned a boy is equipped with suggestions and directions enough to keep him busy and well employed for several seasons.

MOLE CRICKET LODGE.

BERTHA SEAVEY SAUNIER.

MR. and Mrs. Mole Cricket had folded their hands for the winter. The busy season was over, for the ground was all hard with the foot tread of Jack Frost and the snow lay all over the lodge — a solid, warm cover that squeaked and crunched quite musically when little Boy Will rode back and forth on it with his sled Dasher.

Shadows lay rather heavily in the lodge. The caverns and galleries which had been built in warmer times were hung with darkness and all was still in slumber.

Side by side in the chamber, just under the long, dead grass and the white snow, with a roof formed of tiny roots and loose earth, lay Mr. and Mrs. Mole Cricket.

It was the same chamber in which had lain the little white eggs that the warm sun had hatched, and from it the young crickets had gone out, already valiant, to burrow their own galleries, and seek their own food.

Slumber had gone on in the chamber for many weeks when, at a sudden sound, Mr. Cricket moved. We fancy he was cross at being disturbed. "What's that?" he said.

"Boy Will," answered his wife. "He's digging up the snow to make a snow man, and shouting."

"He'll make us cold," grumbled Mr. Cricket.

"Then we must go to the cavern."

"But we can't—I'm as stiff as a stick."

"I believe I am, too."

The earth that covered their roof was very sandy and loose, when not frozen, and as it was, it yielded readily to persistent thumps such as now fell about it. The snow was soggy—just right for building purposes—and Boy Will, in his enthusiasm, scraped up a shovelful of dirt with the last bit of snow that covered the lodge. His sharp eyes saw something black lying beneath the little dead roots that had in the summer belonged to his forget-me-nots. He took the shovel—it was his mother's stove shovel—and carefully pried the dark bundle up, and with his little red fingers separated it from its wrappings.

"Aha!" he said, and ran into the house. "Look a-here!" he cried as he ran up to his father's desk. "Well, well!" said his father, looking at the objects through gold-bowed spectacles, "that's the same sort of fellow that we teased last summer with a grass blade."

"Tell me," said Boy Will, in wonder, "don't you remember the little hole in the garden, and when I put in a spear of grass how the fellow grabbed it with his jaws? I drew him out and there was Sir Mole Cricket that does so much mischief in the garden."

"Oh yes; and now here are two; but they are dead."

"No, only asleep for the winter. The warm room will revive them but they may die after all. They will have awakened out of season."

"I wish I could put them back," said Boy Will.

"We will study them a little and then we will see," returned his father as he took up his penknife and pointed to the folded legs.

"Those big flat fore-legs are what do all the mischief. They are like strong little hands and have claws on them and they are used for digging. The main business of Sir Cricket is to burrow and he works away with these hands of his until he will have made a number of underground passages. And in his work he will cut off hundreds of new, tender roots that belong to plants and shrubs. And that's the mischief of him."

"What do they eat?"

"Why, little bugs; but they are fierce, hungry creatures, and when they meet a mole cricket that is weak and defenseless they pounce on him and eat him. They are no respecter of relatives."

"They don't deserve to live!" cried Boy Will, with a stamp.

"But we can give them their chances," returned Mr. Rey. "Now look at this one. There are two sets of wings. One outside and one inside like grasshoppers, but much shorter. Here are two delicate feelers, or antennæ, bent backward, and two at the end of the body. I suppose those are for the purpose of dicovering any danger that might approach them from behind while they are busy at digging. The jaws are toothed and horny, and so, all in all, we may put Sir Cricket down in the same order in which are the katydid, grasshopper, field and house cricket, cockroach, earwig and so on, which is the order *Orthoptera*. Now come and show me where you found them."

Boy Will led the way where stood his half-built snow-man, and Mr. Rey with a stick felt about in the chamber for the opening to another cavity to the lodge.

"Ah, here it is—a warmer and a better one than the other because it is deeper," and he slipped the two objects in and stopped the doorway with earth and snow.

"Well, I declare!" said Mr. Mole Cricket from under his horny skin, "What do you think of that?"

"Why," said his wife, "they've put us in the cavern where we should have been in the first place. What a mistake it was to go to sleep in the nursery! Now we shall be quite safe until spring."

"Well, well, true enough!" returned Sir Mole Cricket. And they both fell asleep again.

SNOW BIRDS.

This poem, by Louis Honore Frechette, the laureate of Canada, is very fine in the original, and holds the same position in French-Canadian literature that Bryant's "Lines to a Waterfowl" occupies in American classics. It is one of the poems that won for its author the crown of the French academy and the Grand Prix Monthyon of 2,000 livres.

When the rude Equinox, with his cold train
From our horizons drives accustomed cheer,
Behold! a thousand winged sprites appear
And flutter briskly round the frosty plain.

No seeds are anywhere, save sleety rain,
No leafage thick against the outlook drear;
Rough winds to wildly whip them far and near;
God's heart alone to feel their every pain.

Dear little travelers through this icy realm,
Fear not the tempest shall you overwhelm;
The glad spring buds within your happy song.
Go, whirl about the avalanche, and be,
O birds of snow, unharmed, and so teach me:
Whom God doth guard is stronger than the strong. —*C. G. B.*

VEGETATION IN THE PHILIPPINES.

MUCH attention has of late been devoted to the Philippines, and as one result considerable interest has been evinced in their natural products. In the matter of vegetation they are highly favored. Fruits grow in great abundance, and the reputation of some of them is already established abroad, as is the case, for example, with the mango. Other fruits grown in the islands are the ate (the cinnamon apple of the French colonists), the mangosteen, the pineapple, the tamarind, the orange, the lemon, the jack, the jujube, the litchi (regarded by the Chinese as the king of fruits), the plum, the chicomamey (the sapodilla of the West Indies), the bread fruit, and the papaw. The last named is eaten like a melon, and is valued as a digestive; its juice furnishes an extract which is used as a medicament under the name of papaine, or vegetable pepsin. The banana grows abundantly and is a great boon to the poor people, supplying them with a cheap, delicious, and exceedingly nutritive food; there are many varieties, ten of which are in particular highly esteemed.

Plants which are cultivated for industrial purposes include the sugar cane, of which four varieties are grown —yellow cane, Otaheite cane, purple or Batavia cane, and striped cane. Of vegetables there are several pulses used as food by the natives which never appear on the tables of the European settlers. These include the mango, mentioned above, and three or four kinds of beans, such as the butingue, the zabache, the Abra bean, and the Patami bean. These suit the natives much better than the garbanzos, or chick peas, that are so highly prized by the Spaniards. Among the tuberous roots valued as food the sweet potato ranks first, with an annual production of 98,000,000 pounds. The common or white potato, although of inferior quality, stands next in importance. Then follows the camotengcahoy or manihot (cassava), the root of which is made edible by the removal of its poisonous juice in the same way as in the West Indies. After expression of the juice the pulp forms a sort of coarse-grained flour that is very nutritious, pleasant to the taste and easy to digest. Besides these tubers other plants, such as the ubi, the togui and the gabi, are cultivated in the fields for the sake of their edible roots. Other edible vegetables include calabashes, melons, watermelons, cucumbers, carrots, celery, parsley, tomatoes, egg plants, peppers, capers, cabbages, lettuce, endives, mustard, leeks, onions, asparagus, and peas. Of the cocoa palms the ordinary cocoanut tree is the most important, the oil of which is put to many and varied uses. The bamboo is much valued, the young and tender shoots making a very acceptable article of food, in the form of salads and other dishes, and the fibre is used for numerous purposes. Tobacco as a cultivated crop is generally grown in the same field as maize. Of spices the Philippines grow cinnamon, nutmegs, pepper, ginger, and majoram. Of medicinal plants the most familiar are the papaw, already mentioned, and ipecacuanha.

Among aromatic and ornamental plants may be mentioned magnolias, camellias, clematis, several kinds of roses, dahlias, ylang-ylang, papua, jessamine, and many species of orchids and ferns. These, however, grow wild in such profusion that little care is bestowed upon their cultivation. —*Gardener's Magazine.*

FROM COL. CHI. ACAD SCIENCES
A. W. MUMFORD, PUBLISHER, CHICAGO

CARBONS.
Bituminous Coal

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COMMON MINERALS AND VALUABLE ORES.

3.—MINERALS CONTAINING CARBON.

THEO. F. BROOKINS, B. S.,
Principal Au Sable Forks Union Free School and Academy, New York

AMONG minerals of economic importance carbon minerals hold the unique position of being at the same time of the most common and the most rare occurrence. As far as external appearance indicates, a piece of common coal and the most brilliant diamond are widely separated; with regard to chemical composition they are closely related. Intermediate between the coal of the stoke furnace and the "brilliant" of the jewelry shop is still another well-known form of carbon, the graphite of the lead pencil. These three substances comprise the far greater part of carbon-containing minerals.

In so far as our mind's picture of a mineral is that of an aggregation of crystals of fairly perfect form our consideration of coal as a mineral is erroneous. We must yield to a broader interpretation of the essential characteristics of a mineral and modify our idea so as to include any homogeneous substance (solid, with the single exception of mercury) of fairly definite chemical composition "occurring in nature but not of apparent organic origin." Organic substances are those that are alive or have lived.

Vegetation is, undoubtedly, the origin of all coal, but often much more than a cursory examination is necessary to prove such origin. In the less altered coals the vegetable origin is readily proved by the actual presence of seeds, plant fibers, and other equally apparent organic remains. A microscopic study is necessary for finding the presence of woody fiber in the more metamorphosed form. The word metamorphose comes from the Greek; *meta* means after or over; *morphe* is form. A metamorphosis is a change of form or a forming over.

The history of the discovery of the value of coal as a means of producing heat and of the development of the coal-mining industry covers a comparatively recent period. Coal occurs in such quantities near the surface of the earth's crust and its outcrops are so numerous that it cannot have failed to attract the attention of the most ancient of peoples. Indeed, that coal could be used as a fuel is mentioned by a writer, Theophrastus, who lived 300 years B. C. The ancient Celts of Britain are reputed to have evidenced knowledge of the industrial value of coal. It was not until near the middle of the thirteenth century, however, that coal became so important an economic product as to result in statutes granting to certain places the privilege of mining it. After a long period of trial in England the superiority of coal over other fuels was recognized, and stone coal, as the harder form was commonly known, came into general use. In America bituminous, or soft coal, was mined to a slight extent in the latter half of the eighteenth century. The form now commonly used in house-heating furnaces, anthracite, for a long time baffled the colonists in their efforts to make it burn. The knowledge that an anthracite fire is most effective if not continually poked is said to have been acquired generally by accident.

Europe and the United States to-day produce practically all the coal of the world. In Europe, Great Britain, Germany, France, Austria-Hungary, and Belgium are the main sources of supply. Several important coal areas exist in our own country, notably that of

the New England basin, with an area of 500 square miles; the Appalachian district, with an area of 65,000 square miles; the northern area, in Michigan, covering 7,000 square miles; the central area, comprising parts of Illinois, Indiana and Kentucky, and including 48,000 square miles; the scattered western area, with a total of 98,000 square miles; the indefinite Rocky Mountain area, and the Pacific coast region, including parts of California, Oregon, and Washington. Coal mining is yet an undeveloped industry in our territorial possessions. Alaska has an abundant supply of coal, and lesser quantities are found in Cuba and Porto Rico.

Mention has already been made of the two common kinds of coal, bituminous and anthracite. These two kinds mark different stages in the transformation from plant organism to mineral product. As the biologist traces the successive steps in the evolution of an individual of a species from germ to adult, so the geologist unfolds before us the wonderful history of a piece of coal from its first appearance on the earth to the time when it is thrown into our fire grate as fuel. Coal is the metamorphosed product of vegetable growths, changed by atmospheric agencies and the internal forces of the earth acting through a total period of perhaps millions of years. In the remote past, ages before man had appeared on the earth, the atmosphere of our globe was highly charged with carbon gases. Vegetation flourished in luxuriance. Great swamps were common. The ocean alternately covered and receded from verdure-clothed land areas. Ponds were transformed to morasses and swamps. In the swamps thus formed, the accumulated sediment of centuries upon centuries covered alternate layers of decayed plant organisms, until finally beds of peat were formed. Great masses above pressed on those underneath; the internal heat of the earth reached up and transformed the densely packed masses of peat until the beds became hard and brown, the product of the partial metamorphism being what we know as lignite, or brown coal. With the continued action of the forces of metamorphism, the lignite turned still darker, and as more gases were driven off, became heavier, until the bituminons stage was reached, which, in turn, was succeeded by the anthracite stage.

Graphite, or black lead, is a mineral containing not more than five per cent of impurities, and is generally supposed to have originated as did mineral coal, and to represent a still more advanced stage of development. It occurs in various localities both in the vicinity of coal measures and far removed from them. The chief part of the world's supply comes from Ceylon, though Germany and the United States produce quantities of graphite of excellent quality. In the Laurentian rocks of Canada, and of course with as ancient origin, extensive deposits are found. This presence of graphite in strata in which as yet no certain traces of organic life have been found has led some to believe that this form of carbon mineral may have another than organic origin.

Various uses are served by graphite. The chemist finds it of great value in making his crucibles; the engineer uses it, finely powdered, as a lubricant; the housekeeper polishes stoves with it; the electrician uses it in his arc lights; all civilized nations use it in the lead of lead pencils. The stem, *grapho* (to write), on which so many of our words, as geography, telegraph, graphophone, etc., are formed, suggests also the origin of the name, graphite. The finest quality lead pencils are those made from graphite occurring in a state sufficiently pure to allow the cutting and grinding of pieces to the size needed. In the case of the medium and poorer grade pencils. the graphite has first been finely powdered and then pressed into the requisite shape and size.

The purest form of carbon found in nature is the diamond. The rare occurrence of diamonds indicates that the essential conditions in nature for causing the transformation of some less pure form of carbon into diamond are seldom present. While diamonds have actually been produced in the laboratory by far-seeing and indefatigable

chemists, yet the cost of such products is so great as to preclude the possibility of the most precious of gems becoming at all common. The diamond is the hardest of all known substances, and will scratch any other mineral across which it may be drawn.

Three localities have successively furnished the main part of the world's stock of diamonds. A century and a half ago, practically all the diamonds came from India, where at one time 60,000 persons were employed in diamond digging. Toward the middle of the eighteenth century, when the diamondiferous districts of India were becoming exhausted, the discovery of the precious gem in Brazilian deposits was made. At present, the supply of diamonds from Brazil has much diminished, and the diamond fields of South Africa, where is located the famous Kimberley mine, produce the larger part of the world's output of diamonds.

Among famous diamonds of the world should be mentioned the Koh-i-noor of the British crown, which, Hindu legend relates, was worn five thousand years ago by one of their national heroes. The largest known diamond, weighing three hundred sixty-seven carats, was found in Borneo, and is now owned by the Rajah of Matan.

FEBRUARY.

FEBRUARY,—fortnights two,—
Briefest of the months are you,
Of the winter's children last.
Why do you go by so fast?
Is it not a little strange
Once in four years you should change,
That the sun should shine and give
You another day to live?
May be this is only done
Since you are the smallest one;
So I make the shortest rhyme
For you, as befits your time:

You're the baby of the year,
And to me you're very dear,
Just because you bring the line,
"Will you be my Valentine?"

—Frank Dempster Sherman.

The snow had begun in the gloaming,
And busily all the night
Had been heaping field and highway
With a silence deep and white.

Every pine and fir and hemlock
Wore ermine too dear for an earl,
And the poorest twig on the elm-tree
Was ridged inch-deep with pearl.

From sheds new-roofed with Carrara
Came Chanticleer's muffled crow,
The stiff rails were softened to swan's-down,
And still fluttered down the snow.

—Lowell.

LICORICE.

(*Glycyrrhiza glabra L.*)

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy.

But first he cheweth greyn and *licorys*
To smellen sweete. —*Miller's Tale, l. 504; Chaucer.*

THE licorice yielding plant is a perennial herb with a thick root-stock, having a number of long sparingly branched roots and very long runners or rhizomes. It belongs to the same family as the peas and beans (*Leguminosæ*). It has purplish flowers with the irregular corolla characteristic of the family. The pods are rather small, much compressed, each with from two to five seeds.

The plant is in all probability a native of the warm parts of the Mediterranean region. There are several varieties of *G. glabra*, all of which are more or less extensively cultivated and placed upon the market.

As to the exact habitat of licorice there is some difference of opinion. According to some authorities its native home is in the vicinity of the sea of Azov. Dioscorides was among the first to give a description of the plant and designated the pontic lands and Kappadonia of Asia Minor as its home. The Romans named the plant *Glycyrrhiza*. Celsius, Scribonius Largus, and Plinius described it as *Radix dulcis*, sweet root, on account of its sweet taste. Galenus, the eminent Roman physician, made extensive medicinal use of the roots as well as of the juice. Alexander Trallianus also recommended licorice very highly. Although this plant enjoyed extensive use during the middle ages it was apparently not included in the herbal list of Charlemagne, *Karl der Grosse*. In the 13th century licorice was highly prized in Switzerland as a remedy for lung troubles. It was similarly used in Wales and in Denmark. Pietro di Crescenzi of Bologna (1305) was the first to give a full report of the occurrence and cultivation of licorice. The Benedictine monks of St. Michaelis cultivated it extensively in the vicinity of Bamberg. The eminent authority, Flückiger, reports a peculiar practice by these monks. A new hand in the horticultural work was initiated by requiring him to dig up a complete root of a licorice plant with all its branches including the rhizome. This was by no means an easy task on account of the ramification of the roots and the extreme length of the rhizome.

Glycyrrhiza is extensively cultivated in Greece, Italy, France, Russia, Germany, the Danubian Provinces, southern China, northern Africa, and to some extent in England. In the Italian province of Calabria licorice is planted with peas and corn. In the course of three years the roots are collected, the juice expressed and root evaporated to the proper consistency for shipping. New crops are grown from cuttings of the rhizomes. There is an excellent quality of licorice grown in the vicinity of Smyrna. The principal commercial varieties are grown in Spain, southern Russia, Turkey and Italy. Spanish and Russian licorice root is dried and shipped in bales or bundles. Spanish licorice root is unpeeled and occurs in pieces several feet in length. Russian licorice is usually peeled. Most of the licorice used in the United States is obtained from Italy, Russia, and Germany. Some of the licorice found upon the market is quite fragmentary and very dirty. The licorice raised in England is intended for home consumption and is placed upon the market in both the fresh and dried state. The fresh roots have an earthy and somewhat nauseous odor. The peel, or bark, of the roots contains tannic acid and a resinous oil, both of which are undesirable; hence the peeled article is usually preferred.

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LICORICE.

CHICAGO:
A. W. MUMFORD PUBLISHER

The characteristically sweet taste of the licorice roots and rhizomes is due to glycyrrhizin and some sugar. Glycyrrhizin is a glucoside which splits up into glucose, a substance closely akin to sugar, and glycyrretin, a bitter substance. The extract of licorice is prepared by crushing the fresh roots or rhizomes, then boiling repeatedly in water, expressing and then condensing the sap in copper kettles until it is quite hard when cooled. In Calabria the condensed juice, while still warm and pliable, is rolled into sticks and stamped with the name of the locality where it was prepared. In those countries where the fresh roots cannot be obtained the dried roots are crushed and then treated as above. The licorice sticks prepared in this country usually have stamped upon them the initials of the manufacturing firm. Much of the evaporated juice is also placed upon the market in large lumps or masses. The pure licorice extract, prepared as indicated above, is a glossy black, very brittle, with a glassy fracture. For shipment it must be carefully packed to prevent its being broken into small bits. To reduce the brittleness various substances are added as starch and gum arabic.

Licorice extract is a highly appreciated sweetmeat but unfortunately it is often grossly adulterated with dextrin, starch, sugar, and gum arabic. Many of the licorice drops, etc., contain very little licorice, but even the poorest article seems to be highly prized by the average child. Licorice extract in mass is known as licorice paste and is extensively employed in preparing chewing tobacco and in brewing beer, to which substances it imparts a peculiar flavor and a dark color.

Licorice extract is a popular remedy for colds and sore throat, though its curative powers are certainly very slight. Physicians make extensive use of it to disguise the disagreeable taste of medicines, such as quinine. It is an ingredient of many cough remedies. The finely powdered roots are dusted over pills to prevent their adhesion and to give them consistency.

Licorice roots have the same properties as the extract and may be similarly used. Many children prefer the dried roots obtained at the drug store to the stick licorice or the licorice drops. This choice is in many respects a good one; the roots are at least not adulterated, but of course only the juice should be swallowed—a precaution which it is not necessary to emphasize—as the fibrous nature of the wood makes it difficult to swallow. Even if a little of it is swallowed no particular harm would be done, as it is not in the least poisonous, though the fibers may act as an irritant to the stomach.

As already indicated there are several species of *Glycyrrhiza* of which the roots and rhizomes are used like those of *G. glabra*, but, in addition to these there are a number of other plants designated as licorice. Indian licorice or the wild licorice of India (*Abrus precatorius*), is a woody twining plant growing quite abundantly in India; it is sometimes substituted for true licorice. Prickly licorice (*Glycyrrhiza echinata*) resembles true licorice quite closely. The wild licorice of America (*Glycyrrhiza lepidota*) is found in the Northwest. Its roots are quite sweet and often used as a substitute for true licorice. The European plant known as "rest harrow" (*Ononis spinosa*), so-called because its tangled roots impede the progress of the harrow, has roots with an odor and taste resembling licorice. The roots are extensively employed by the country practitioners of France and Germany in the treatment of jaundice, dropsy, gout, rheumatism, toothache, ulcers, and eruptive diseases of the scalp. The name, wild licorice, also applies to *Galium circaezans* and *Galium lanceolatum* on account of the sweetish roots. The wild licorice of Australia is *Teucrium corymbosum*. Licorice vetch (*Astragalus glycyphyllus*) has sweet roots. Licorice weed (*Scoparia dulcis*) is a common tropical plant which also has sweet-tasting roots.

DESCRIPTION OF PLATE.—*A*, flowering portion of plant; 1, flower; 2, 3, 4, parts of the flower; 5, stamens; 6, stigma; 7, ovary; 8, fruit; 9, one valve of pod with seeds; 10, 11, 12, different views of seed.

A WINTER WALK IN THE WOODS.

ANNE W. JACKSON.

LAST week I had the good fortune to be invited with two other girls to spend a few days in the country. We hailed the invitation with delight and accepted it with alacrity, for we all three love to get out into the woods and fields.

We started on Friday afternoon, going the first part of the journey by train. The sky was cloudy and the weather mild. We watched the moving pictures that sped by the car windows as eagerly as children.

After a half-hour's ride we arrived at a little "town" consisting of the station, one store, one house, one grain elevator, and a blacksmith's shop. Here our hostess met us with a surrey and pair, and we were soon driving along at a brisk pace, drinking in the fresh air and country scenery with pure delight. The person whose power of enjoyment in little things has become blunted, is greatly to be pitied. "Ours was as keen as though newly sharpened for the occasion; and nothing we saw, from the fields, trees, and hedges, to the setting sun, failed to give us pleasure.

A merry drive of three or four miles brought us to the farm-house, where we were cordially welcomed.

I should like to tell you about all the fun we had that night, for it was our hostess' birthday, and there was a surprise party, at which *we* were as much surprised as she was. But as it is our walk I'm going to tell about, I must leave the events of our first evening unrelated.

The next morning we three girls decided to take a walk, as we were anxious to see what birds there were about. It was a gray day, threatening rain, and very wild for December.

The moment we set foot out of doors the distant "caw-caw" of the crows sounded like an invitation in our ears. How I love that sound! It is to the ear what a dash of color is to the eye.

We took the road to the right, where we saw some woods a quarter of a mile or more away.

Before we had gone far we heard a medley of bird notes coming from the fields on our left. We couldn't make out what they were, as they were some distance away, but I caught a note now and then that sounded like a fragment of the meadow-lark's song—just a faint reminiscence of it.

After passing two pastures and a cornfield on our left, we came to a piece of thin timber land. The road, which began to descend here, had been cut down somewhat, leaving banks more or less steep on either side. We went along slowly, stopping frequently to examine the beautiful mosses and lichens which abounded. We had seen no birds, with the exception of a woodpecker, at close range yet.

Presently we came to a turn in the road which led us up a slight rise of ground, bordered on both sides by woods. Arrived at the top of this hillock we loitered about looking at the many interesting thing that are always to be seen in the woods. All at once we were startled by a shrill scream, or cry, which sounded like some young animal being strangled, and behold! an immense hawk flew off over the treetops. It didn't fly very far though, and gave us more of its music at intervals.

The road from this point led down to a small brook spanned by a wooden bridge. Looking down toward this bridge, a gorgeous sight met our eyes. A flock of cardinals, half a dozen or more, were flying and sporting about among the low bushes near one end of it. What a delicious touch of color for a winter landscape! There were chickadees, too, hopping about among them in a most neighborly fashion. We watched them closely, quietly drawing nearer and nearer. Pretty soon they flew into the trees close by, and from thence deeper into the woods. We saw and heard many woodpeckers, both the downy and the hairy being very plentiful.

As the place where we had seen the redbirds was such a pretty one, we

were in no haste to leave it, even after they had departed. So we perched ourselves on top of an old rail fence, and waited for some birds to come to us and be looked at. We hadn't been there very long before some tufted titmice came into the trees near us, and delighted us with their cheery notes and cunning ways. The "caw" of the crows was quite loud here and, with the added notes of the woodpeckers and chickadees, made it quite lively. Every once in a while a few drops of rain would fall. But this only added to the wildness of our surroundings, and seemed to put us farther away from the rest of the world.

Though we found our rural perch very enjoyable, we felt obliged to move on again, however reluctantly. So we crossed the bridge and climbed the hill beyond. A short walk then brought us to another turn, to the right, but on the left an open gate into the woods.

We lost no time in turning in here, you may be sure. We found many more birds inside the woods than we had along the road. Here were titmice, chickadees, plenty of nut-hatches white - breasted; hairy and downy woodpeckers, and also a third kind that we were uncertain about. Its upper parts looked like black and white shepherd's plaid, and the back of its head and nape were deep red. Its note was a sonorous *cow-cow-cow-cow-cow*. We heard brown creepers about, and saw many flocks of juncos.

When we came to the end of the woods we saw a pair of our cardinals flying about some low brushwood. It was like seeing old friends.

I must not forget to mention the blue-jay, who added his voice and brilliant color to the pleasure of our walk.

We had entered a cornfield, and as we advanced, flocks of little birds, mostly juncos, would start up before us and fly into the hedge or next field, twittering gaily. Twice we heard distinctly the goldfinch's note; but as the birds all flew up at our approach, we couldn't get near enough to distinguish them. It seemed very odd to hear this summery note amidst that wintry scene.

We crossed the cornfield and came to a fence, at right angles, following which took us in the direction of the road. Just as we came up to a few scattered trees, part in the field, and part in the pastures on the other side of the fence, we again heard our medley chorus of many voices, some of which had reminded us of the meadowlark's. The members of the chorus who proved to be the meadowlarks' cousins, the rusty blackbirds settled in these trees and gave us a selection in their best style. Some of the solo parts were really sweet.

After climbing a rail fence we crossed a small pasture and looked in vain for a gate. Nothing but barbed wire. We finally made our escape through a pigs' corn-pen, from whence we emerged into another pasture where the grass was like the softest carpet to our feet. This pasture had a gate opening onto the road; so we were very soon back again at the house, with appetites for dinner fully developed.

We saw and heard no less than fourteen different kinds of birds during our walk. So those who desire to see birds need not despair of finding them because it is winter. Nature always has plenty of beautiful things to show us, no matter what the time of year.

My story ought to end here, but I must tell you about the tufted "tits" we saw next morning. The weather turned very cold that night, and in the morning a keen wind was blowing, so we didn't think many birds would be about. But hearing some chickadees in the yard, we ventured out, and went across the road, where we sat down in the shelter of a large corncrib.

From here we saw plenty of chickadees, titmice, nut-hatches, and other woodpeckers busily engaged in hunting their breakfasts. We had a fine opportunity of studying them with our glasses.

One bold "tit" stole a grain of corn from the crib and carried it off to the tree in front of us, where he took it in his claw, and proceeded to pick the choicest morsel out of it. Presently another tufted rogue flew up and there were some "passages of arms," and a flight into another tree, and in the midst of the fray, alas! the corn was dropped.

THE SCARLET PAINTED CUP.

PROF. WILLIAM KERR HIGLEY,
Secretary of The Chicago Academy of Sciences.

These children of the meadows, born
Of sunshine and of showers. —*Whittier.*

THE scarlet painted cup belongs to a large and interesting group of plants known as the figwort family (*Scrophulariaceæ*). The common name of the family is derived from the reputed value of some of the species in the cure of ficus or figwort, a disease caused by the growth of a stalked excrescence on the eyelids, tongue, or other parts of the body that are covered with a mucous membrane. The technical name is derived from scrofula, as some of the species are considered efficacious in the treatment of that disease. This family includes about one hundred and sixty-five genera and over twenty-five hundred species. They are common all over the world, reaching from the equator into the regions of constant frosts. It is claimed by some authorities that fully one thirty-fifth of all the flowering plants of North America are classed in this family.

Besides the painted cup there are classed in this group the mullen, the common toad-flax, the foxglove (*Digitalis*), the gerardias, and the calceolarias.

The foxglove, though causing death when the extract is taken in excess, is one of the most highly valued medicinal plants known. Nearly all the species of the family are herbs, without fragrance. Some of the species are known to be partially parasitic. True parasites are usually white or very light colored and contain no green coloring matter, which is essential when the plant is self-supporting. The parasitic forms of this family, however, do contain green coloring matter and are thus not entirely dependent on their host for the preparation of their food supply. The gerardias (false foxgloves) are frequently found attached to the roots of oaks, large shrubs, and even on the roots of grasses. It has also been shown that there is a cannibalistic tendency in some of the species of gerardia. They will not only fasten their sucker-like roots on those of other species, but also upon those of other individuals of the same species, and even upon the root branches of their own plants. This double parasitism is not rare.

The scarlet painted cup of our illustration (*Castilleja coccinea, L.*) is a native of the eastern half of the United States and the southern portion of Canada. It prefers the soil of meadows and moist woods and has been found growing abundantly at an elevation of from three to four thousand feet.

The generic name was given this plant by Linnæus in honor of a Spanish botanist. The specific name is from the Latin, meaning scarlet. Nearly all of the forty species are natives of North and South America.

The flowers are dull yellow in color and are obscured by the rather large floral leaves or bracts, which are bright scarlet—rarely bright yellow—in color. These conspicuous leaves are broader toward the apex and usually about three-cleft. By the novice they are usually mistaken for the flower, which is hardly noticeable. The stem seldom exceeds a foot in height and bears a number of leaves that are deeply cut in narrow segments. The bright color of this plant has given it many local common names more or less descriptive. Prominent among these is the Indian paint brush.

A pretty myth tells us that the painted cup was originally yellow, but that Venus, when lamenting the death of Apollo, pressed a cluster of the blossoms to her parched lips and drank the dew from the flowers, the outer leaves of which have ever since retained the color of her lips.

BY PER HARRIET E. HIGLEY.
A. W. MUMFORD, PUBLISHER, CHICAGO.

YELLOW LADY'S SLIPPER AND PAINTED CUP.

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THE YOUNG NATURALIST.

SAHARA SEA.—Much of the great desert of Sahara is below the level of the Atlantic. It is proposed that the water be let in. The space covered would be big enough to warrant us in speaking of it as an ocean. There would be islands in it, as there are places that are of considerable elevation.

So much water would make a difference in climate in all directions from the present desert. It is thought the vineyards of southern Europe would be injured, as they are dependent on the dry winds that come across the Mediterranean from the great desert. The rainfall in at least one-third of the inhabited parts of the globe would be affected by this great change in the amount of water on the surface. Ships would be able to sail to ports at the south of Morocco and Algiers where now are shifting sands and few people, and new cities would spring into being far to the south where the new coast line would be formed.

There are other low and barren spots on the earth's surface that are below sea level. They would form useful basins of water if the proper canals were dug. A company has been formed to let water into the Yuma desert in southern California, where 13,000 square miles of land with no inhabitants, lies below the sea level, some of it as much as 1,000 feet. A great desert in the middle of Australia is also low. If it were flooded it would make of Australia a great rim of continent reaching round an immense sea.

One scientist has advocated the making of the Red Sea into a great fresh water lake by changing the course of the Nile so as to make that sea its outlet instead of the Mediterranean. By preventing the flow of salt water from the north through the Suez canal, and building an embankment at the south, it has been estimated that the Red Sea would become fresh in the course of time.

The Red Sea project is not at all likely to be carried out, but those for California and the Sahara may soon be made effective. When the world of commerce comes to realize what the Sahara Sea will mean for its enterprise, there will be a lively prospect of much digging and plenty of fighting over the damages done to existing interests and the rights of the various European nations to the new seaboard that will be formed.

FEEDING.—One of the duties of the teamster is to see that his horses are well fed. Where the team must be on the road at five in the morning it is the business of the man who feeds them to get up at four to give them time to eat. Incidentally he rubs them down and gets his own breakfast in a leisurely manner. An Ohio man has an electric device which will give the teamster a chance to lie a little longer in the morning. He has arranged an alarm clock which may be set for any hour so that instead of striking the hour it will make an electric connection. This connection lets fall a bag that is placed the night before over the manger of the horse to be fed at that hour in the morning. The first sound that greets the ear of the horse is not the teamster coming to open the stable, but the rattle of oats into his feed-box, and he has ample time to eat and begin the operation of digestion before he sees the man who used to be so welcome. Possibly he will not greet the man so affectionately in the future when his coming means not food for a hungry stomach but a hard day's work. But those who know the horse best are inclined to believe that the horse will always greet his master affectionately in the morning regardless of the state of his stomach.

RUBBER.—The use of rubber has grown wonderfully in the last ten years. Every year a rubber famine is predicted, and every year someone an-

nounces that a substitute has been found that is just as good as the real article. The facts seems to indicate that neither the famine nor the substitute is really at hand. Rubber plantations are being extended in Mexico to meet the demands of the growing trade, but the bulk of our rubber still comes from the Amazon country in South America, and that country is almost limitless in its supplies of this article. It is true that the trees along the banks of the rivers have been tapped until their product is much inferior to what it once was, but this condition exists only for a distance of two or three miles along the river banks. There are plenty of magnificent trees standing untouched a little farther back. All that is needed to get more rubber is to get more men into these forests gathering it. The real difficulty is to get the men to do the work. The finest rubber forests remaining near the river fronts are along the Purus, one of the large rivers flowing into the Amazon from the south.

SUNSHINE CAUGHT.—For thousands of years men have tried to use the heat of the sun's rays in the place of fire. It is now claimed that Dr. William Calver of Washington has finished an invention which will bring into the space of a few inches all the rays of heat from the sun that would naturally fall upon one acre of ground. By bringing so many rays to a focus he gets such a powerful heat that iron and steel melt in it like icicles.

A magnifying glass or lens of almost any sort held in the sunshine makes a bright, warm spot. Dr. Calver's machine gets the same effect, only more powerfully. He has secured a temperature of several thousand degrees Fahrenheit. To make his machine useful for heating houses and making steam for factories he has invented a reservoir to store the heat gathered while the sun is shining, so that it may be used at night or on dark days. Men of science have been looking for such a machine for a long time, and if Dr. Calver and his friends are not much mistaken his invention will be as great a help to civilization as the harnessing of Niagara Falls for electric work. His laboratory is in the outskirts of Washington, D. C.

WASHINGTON'S MONUMENT.

GEO. P. MORRIS.

A monument to Washington?
A tablet graven with his name?
Green be the mound it stands upon,
And everlasting as his fame!

His glory fills the land—the plain,
The moor, the mountain and the mart!
More firm than column, urn or fane,
His monument—the human heart.

The Christian, patriot, hero, sage!
The chief from heaven in mercy sent;
His deeds are written on the age—
His country is his monument.

"The sword of Gideon and the Lord"
Was mighty in his mighty hand—
The God who guided he adored,
And with his blessing freed the land.

The first in war, the first in peace,
The first in hearts that freemen own;
Unparalleled till time shall cease—
He lives, immortal and alone.

Yet let the rock-hewn tower rise,
High to the pathway of the sun,
And speak to the approving skies
Our gratitude to Washington.

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. VII. MARCH, 1900. NO. 3

THE ENGLISH SPARROW.

F. S. PIXLEY.

You may talk about th' nightingale, th' thrush 'r medder lark,
'R any other singin' bird that came from Noah's ark;
But of all feathered things thet fly, from turkey-buzzard down,
Give me the little sparrer, with his modest coat o' brown.

I'll admit that in th' springtime, when th' trees 're gettin' green,
When again th' robin red-breast 'nd th' bluebird first 're seen;
When the bobolink 'nd blackbird from th' southland reappear,
'Nd the crow comes back t' show us that th' spring is really here—

I'll admit that in the *springtime*, when the groves with music ring,
Natur' handicaps th' sparrer; he was never taught to sing;
But he sounds th' Maker's praises in his meek 'nd lowly way;
'Nd tho' other birds come back at times, *he* never goes away.

There's a cert'in sort o' people thet, when th' skies 're bright,
Will hang around 'nd talk about their friendship day 'nd night;
But if things cloudy up a bit 'nd fortune seems t' frown,
They're sure t' be th' first t' kick a feller when he's down.

So when the summer skies 're bright it's easy 'nough t' sing;
But when it's cold 'nd rains 'r snows it's quite a diff'rent thing.
In autumn, when th' nippin' frosts drive other birds away,
Th' sparrer is th' only one with nerve enough t' stay.

'Nd even in midwinter, when th' trees 're brown 'nd bare,
'Nd th' frosty flakes 're fallin' thro' th' bitter bitin' air,
Th' sparrer still is with us—t' cheer us when we're glum,
Fer his presence is a prophecy of better days t' come.

Th' sparrer's never idle, fer he has t' work his way;
You'll always find him hustlin' long before th' break o' day.
He's plucky, patient, cheerful, 'nd he seems t' say t' man,
"I know I'm very little, but I do th' best I can."

What more can you 'nd I do than t' always do our best?
Are we any more deservin' than th' "little British pest?"
So, when you talk of "feathered kings" you'd better save a crown
Fer the honest little sparrer, with his modest coat o' brown.

THE PEACOCK.

With pendant train and rustling wings,
Aloft the gorgeous peacock springs;
And he, the bird of hundred dyes,
Whose plumes the dames of Ava prize.

—*Bishop Heber.*

IT WAS a saying among the ancients, "As beautiful as is the peacock among birds, so is the tiger among quadrupeds." The birds are of many varieties, some white, others with crests; that of Thibet being considered the most beautiful of the feathered creation. The first specimens were brought to Europe from the East Indies, and they are still found in flocks in a wild state in the islands of Java and Ceylon. The common people of Italy describe it as having the plumage of an angel, the voice of a devil and the intestines of a thief. In the days of king Solomon his navies imported from the East apes and peacocks, and Ælian relates they were brought into Greece from some barbarous country, and that a male and a female were valued at a hundred and fifty dollars of our money. It is said also that when Alexander was in India he saw them flying wild on the banks of the river Hyarotis, and was so struck with their beauty that he imposed a fine on all who should slay or disturb them. The Greeks were so much taken with the beauty of this bird, when first brought among them, that it was shown for money, and many came to Athens from surrounding countries to see it. It was esteemed a delicacy at the tables of the rich and great and the birds were fatted for the feasts of the luxurious. Hortensius, the orator, was the first to serve them at an entertainment at Rome, and they were spoken of as the first of viands. Barley is its favorite food, but as it is a proud and fickle bird there is scarce any food it will at all times like. It lays waste the labors of the gardener, roots up the choicest seeds, and nips favorite flowers in the bud. He requires five females to attend him, often more. The peahen is compelled to hide her nest from him that he may not disturb her sitting. She seldom lays above a dozen eggs, which are generally hatched about the beginning of November. Though the peafowls invariably roost in trees, yet they make their nests on the ground, and ordinarily on a bank raised above the common level. The nest consists of leaves and small sticks. From January to the end of March, when the corn is standing, the flesh is juicy and tender, but during the dry season, when the birds feed on the seeds of weeds and insects, it becomes dry and muscular.

In some parts of India peacocks are extremely common, flocking together in bands of thirty and forty in number, covering the trees with their splendid plumage and filling the air with their dissonant voices. Captain Williamson mentions that he saw at least twelve or fifteen hundred from where he stood.

Peacocks are very jealous of all quadrupeds, especially of dogs. When they are discovered in a tree situated on a plain, if a dog is loose and hunts near it, the birds will rarely move but will show extreme uneasiness. One of these birds in the north of Ireland was a curious mixture of cruelty and fun. He had four mates but he killed them all successively by pecking them to death, for what cause no one could ascertain. Even his own offspring shared the same fate, until his owner placed the peafowl's eggs under a sitting hen and forced her to hatch the eggs and care for the young. His great amusement was to frighten the chickens. There were two iron troughs in which the food for the chickens was placed daily. No sooner had they gathered about them, when the peacock would erect his train, rattle his quills together with that peculiar rustling sound that is so characteristic of these birds, and march slowly toward them. The poor little chicks would slowly back away from the troughs as the peacock advanced, not wishing to lose sight of the food yet not daring to remain in defiance of their persecutor. By de-

FROM COL. F. NUSSBAUMER & SON.
A. W. MUMFORD, PUBLISHER, CHICAGO.

PEACOCK.

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grees he got them all into a corner, crouching together and trembling when he would overshadow them with his train, place the ends of the feathers against the wall so as to cover them, rattle his quills, in order to frighten them, and then strut off proud of the trick he had played. He did not care for the food which he left untouched.

The peacock's disposition is as variable as that of many other creatures, some being mild and good-tempered, while others are morose and jealous in the extreme. His train, though popularly called his tail, is in reality composed of the upper tail coverts, which are enormously lengthened and finished at their extremities with broad, rounded webs, or with spear-shaped ends. The tail feathers are of a grayish brown color seven or eight inches in length, and can only be seen when the train is erected, that being its appointed task. The female is much smaller than her mate and not nearly so handsome, the train being almost wanting, and the color ashy brown, with the exception of the throat and neck, which are green.

The peacock lives about twenty years and the beautiful variegated plumage of the male's train appears about the third year after birth.

THE SONG OF THE LARK.

ADA M. GRIGGS.

The peasant girl, her feet all bare,
With her rustic grace, has a noble air.

She's queen of the stubble-field and she,
In mind, is free as the lark is free.

Her thought, above all meaner things,
Is soaring with the lark that sings.

No hampered child of the city streets,
Who bows his head whomsoe'er he meets,

Who toils for a pittance with little rest,
But should envy the freedom in this breast.

She's the child of nature; vice does not lure;
She's clothed upon with a life that's pure.

The wholesomeness of her atmosphere
Does more for man than his logic drear.

Who delves in books' philosophic lore,
Sees nature's problems—but little more.

'Tis God's own child who has eyes to see
What is closed to the eye of philosophy.

The artist who dabbles with color and brush
Sees but the reflection of nature's flush.

The skilled musician knows not pure tone;
He hears but the resonance of his own.

'Tis the peasant girl, as she hurries along,
Who hears the lark's good morning song.

She hears it with gladness; her heart is gay;
All nature greets her in festal array.

The lark makes her world a world of song
His notes in her heart sing her whole life long.

She's the true musician, artist and seer;
She looks upon nature with vision clear.

The lark brings her day without shade or sorrow,
And crowns each day with a sweet to-morrow.

He gives a joy only nature can,
A boon sent down from heaven to man.

O little lark, sing on! sing on!
The country dark new life will don.
The tones thou'lt hurl from thy tiny heart
Peace will unfurl and new joy impart.

THE HERALD OF SPRING.

CHARLES E. JENNEY.

Before the snow flies
A bit of Summer skies
Comes flitting down
Through Winter's frown
To cheer up waiting eyes.

ONE gray February day, when dirty patches of snow are still lingering on the north side of rocks and walls, as you gaze across a dreary landscape, you espy a bit of bright color on the bar-post that brightens up your spirit. 'Tis the first bluebird, and that means that spring is coming. His cheery little ditty seems to say, "Spring is coming, spring is coming, spring is here." He has been farther south during the winter, for he seldom stays in Massachusetts in December and January and he thinks it a little chilly just now, for his feathers are all fluffed up around him so that he looks like an animated dumpling.

He has come back to locate his nest site—to see first if the old nest hole of past years is suitable, for he is a great home-lover, and, if not, to select a new one.

In March you will see the bluebirds often investigating rotten bar-posts, hollow cedars, old woodpecker holes, and decayed apple-tree stumps. And in the latter part of the month the females are with them.

Then one April day Mr. Bluebird sings always from a limb of a certain apple-tree, and down in the trunk, in an abandoned woodpecker's hole, are four pretty light blue eggs.

Every old orchard has its family of bluebirds, and they come back to the same nest every year until something happens to scare them away from it. A rotten bar-post or fence rail is a promising site also, and they peck out a hole with their short bills and round it out quite as neatly as that feathered carpenter, the woodpecker. When they get in a little ways you may see the chips flying out of the aperture, though no worker is in sight, and when it is almost done every now and then a blue head will pop out with a beak full of loose wood, which is tossed away. Then a few clean chips are left and the bird's own soft down lines the home.

Often they will make use of wooden boxes set on poles or placed in the trees for their benefit. They are very quiet, peaceful birds, so the entrance to their homes should never be much larger than their own small bodies require for admittance.

The scrubby cedars that grow along the New England coast make excellent nooks and corners for the bluebird's home and the berries provide him with food late in the season. I have even found a pair nesting in a cedar grove on the extreme end of a rocky point exposed to the full force of the southeast storms that sweep up Buzzard's bay. Usually, however, they prefer the green fields and orchards of further inland.

One pair for five or six years nested in a hollow about twelve inches deep formed in the crotch where a cedar tree branched into two parts. It could not have been a comfortable or well-chosen home, for it was open to the weather at the top and it would seem as if it must be flooded in a heavy rainstorm. But it was only abandoned by the birds when it had become known to every boy and egg collector in the village as the hereditary estate of this family.

During April and May the bluebird is everywhere visible and audible, but in midsummer he is not so often seen. He is essentially a bird of the spring with us. His familiar contemporaries are the catbird and the robin, but he is the earliest in the year of them all. Sometimes, though not often, he stops all winter with us, and his red breast warms the winter landscape which it dares to challenge.

See him dash from that old fence post after a mouthful of flies or gnats; or hopping from twig to twig in the cedar tree, selecting the choicest of the spicy berries. Sometimes he will venture in among the crowd of talkative sparrows that are harvesting the crumbs in your dooryard, but if they dispute his right he keeps away. The piece of suet hung in the tree near the bird-box, however, is his own, and he views the intruding buntings and trespassing jays from his front porch or dormer window with much indignation.

However, he says very little, uses no bad language like that of the jay, and soon regains the sereneness of temper natural to him. And we like him all the better for it, for, although it is not nice to be imposed upon and we like to see offenders get their deserts, the one who takes life cheerfully and uncomplainingly overlooks or forgets the wrongs he cannot right is the one we like to have as a friend.

MARCH.

It is the first day of March,
  Each minute sweeter than before;
The red-breast sings from the tall larch
  That stands beside the door.

There is a blessing in the air,
  Which seems a sense of joy to yield
To the bare trees, and mountains bare,
  And grass in the green field.

Love, now a universal birth,
  From heart to heart is stealing,
Form earth to man, from man to earth;
  It is the hour of feeling.

One moment now may give us more
  Than fifty years of reason;
Our minds shall drink at every pore
  The spirit of the season.

—*Wordsworth.*

TAMING BIRDS.

GUY STEALEY.

BUT very few of the boys and girls who watch the many species of our birds flit about in the summer time and who listen in delight to their singing, know that by expending a little time and patience they can make these sweet songsters quite tame. I do not mean that the birds are to be caught and confined; I never could bear to see a bird in captivity, and indeed most wild ones will live but a brief time when so served, but that they can be made gentle in their natural state. Where I live, in the Rocky Mountains, there are countless numbers of birds throughout the spring and summer months and, being a great lover of them, I have naturally observed their habits closely. Trusting, therefore, that some of the boys and girls who entertain the affection for them that I do, will see these lines, I venture to give some of my experiences along the path of bird-life.

Some five years ago I constructed several miniature cottages, with veran-

das, chimneys and all, and placed them on the fences around our garden. The first season two pairs of wrens selected and occupied two of them; a third was chosen by a pair of bluebirds, and the fourth left vacant. Wrens, as you all know, are never much afraid of anyone, but bluebirds are inclined to be shy. After a short time, however, the pair I spoke of would alight within a few feet of where I was weeding vegetables, and soon came to know that where the ground was freshly turned, there were to be found the most worms. Before the summer was over the wrens and bluebirds and I were the firmest of friends. Daily they ran and hopped and peeped under the plants and flowers. And besides giving me their companionship they did a vast amount of good in the garden by keeping it clear of bugs and worms. It was astonishing the number of these they carried to their little ones.

But time stops not, and finally there came cold and frosty nights that warned my little friends, now comprising three families, that the day of their departure for warmer lands was drawing near; and soon I was all alone.

Every year since then has been a repetition of this first, only that I have more houses around now and consequently more tenants. I firmly believe too, that the first three couples still return to their old homes, for the same houses are taken by the wrens every spring and the same one by the bluebirds.

During the winter also, I sometimes have a few bird pets, though they are others than snow birds. The latter I have never been able to make friends with. When the weather is severe I often try to feed them, but with poor success, as they are always very wild. The pets I have reference to are blue jays and campbirds, or as they are more usually called, camp-robbers. Both species stay here the year around.

Last winter I had a laughable time with them. Shortly after the first snow I noticed a pair of camp-robbers—they seem to go in pairs both summer and winter—around our meat-house. If you have never seen them you cannot know what comical birds they are, so solemn and innocent appearing, yet when it comes to stealing—well, they are the greatest and boldest thieves you can find. If they are about and you chance to have anything eatable around and turn your back for a moment you are pretty sure to find it gone when you look again. I remember while camping one fall, of seeing one of them dart down from a tree and take a slice of meat right out of the frying-pan on the fire! But it was too hot to hold long, and Mr. Camp-robber was obliged to relinquish his dainty dinner before reaching his perch again. Arriving there he sat for a long while, looking down at me with a wry face.

But I am digressing, and must get back to my story of the camp-robbers and the meat-house.

A few days after I first saw them, I went in the house to cut some meat for dinner; while there one of the robbers alighted on a bench placed at the side of the door, and stood peeping in. I cut a small piece of meat and tossed it on the step and in a second he had pounced on it and was away. Everyday, from that time on, just at noon, the pair of them would be watching for me, and I made it a rule to put some small pieces of meat or bread on the steps at that hour of the day. As soon as I retreated a little way they would secure them and fly off.

After they had been with me about a month, a bluejay happened along one day, and seeing them at their meal, invited himself to partake of part of it. The camp-robbers seemed somewhat angry at this, but did not venture to remonstrate. The next day there were two bluejays and by the end of a week I had two camp-robbers and seven bluejays looking to me for their daily dinners.

I fed the whole company all winter and when spring came the camp-robbers would almost take food from my hands; in fact they seemed to look to me for protection, when eating, from the bluejays, who were rather overbearing and wanted more than their share.

Whether they will visit me this winter I know not, but I *do* know that I should be glad to see them again.

FROM COL. C. F. SAMUELSE.
A. W. MUMFORD PUBLISHER CHICAGO

WILLOW PTARMAGAN.
½ Life-size.

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THE WILLOW PTARMIGAN.

(*Lagopus lagopus.*)

C. C. M.

IT has been claimed by some ornithologists that this species of grouse is not to be found in this country, but it is now well established that it may be found in northern portions of New Hampshire and northern New York. In summer it is distributed throughout Arctic America. It breeds abundantly in the valleys of the Rocky Mountains on the Barren Grounds and along the Arctic coasts. Davie, who is probably the best authority we have, says that the winter dress of this beautiful bird is snow white, with the central tail feathers black, tipped with white. In summer the head and neck are yellowish red, back black, barred rather finely with yellowish brown and chestnut, although the most of the wings and under parts remain white as in winter. Large numbers of the willow ptarmigan are said in the winter to shelter in willow thickets and dwarf birches on the banks of lakes and rivers, where they feed on the buds of the smaller shrubs which form their principal food at that season. Their favorite resorts in day time are barren, sandy tracts of land, but they pass the nights in holes in the snow. When pursued by sportsmen or birds of prey they dive in the loose snow and work their way beneath its surface.

Nests of this species have been found in the Anderson River region early in June and as late as June 24. Others have been found on the banks of the Swan River as late as June 27. One nest was observed July 10 which contained ten perfectly fresh eggs, and another set of eggs was examined July 22, the contents of which were slightly developed. The nests were mere depressions in the ground, lined with leaves, hay, and a few feathers from the birds themselves. These birds often occupy the same nest in successive seasons. Ten eggs are usually laid, though the female is said to lay as many as sixteen. The eggs have a ground color varying from yellowish buff to deep chestnut-brown, more or less sprinkled, speckled, spotted, or marbled with rich brown or black. The average size is 1.78 by 1.25.

Hallock says that the various species of ptarmigan are all Alpine birds, and are only found in the North and on the highest mountain ranges. They are to be distinguished from all other members of the grouse family by the dense feathering of the tarsus and toes, by turning white in winter and by the possession of only fourteen tail feathers. The bill is very stout and the tail always black. The length of the ptarmigan is about sixteen inches. It is a most delicious article of food, whether roasted, stewed, or in white soups. It is said that visitors to Newfoundland assert that the flavor of a plump partridge, well cooked, is unsurpassed in richness and delicacy. A brace of them in season weigh from three to three and a half pounds. On the first of September they are in prime condition, after feeding on the wild partridge berry and cranberry, their favorite food.

When on the wing it is said the scarlet tips over the eyes of the male bird glisten like rubies. The cock exposes himself fearlessly, when in danger, to save the lives of his offspring. He tumbles along the ground a few yards in advance of the dogs, rolling there in order to decoy the sportsman from the brood which the hen is anxiously calling into the thicket. No more touching instance of paternal affection could be witnessed, or more touching proof among the lower creation of self-sacrifice, prompted by love. The poor, feeble bird would almost attack dogs and men in his efforts to save his children.

At times, in some districts, the ptarmigan is so tame that it can be killed with a stick, and at others so wild that it will not allow the sportsman to approach within gun shot.

ANIMAL PETS IN SCHOOL.

A WISE old man down in Boston says animal pets should be kept in public schools to teach children kindness to the weak. The jokesters are already at work deriding one of the best thoughts anybody has had about education for a long time because it seems, and possibly is, impracticable. They call it a reversal of the Mary's lamb doctrine, and suggest the propriety of letting the children throw paper wads to teach them accuracy and precision.

Despite both its doubtful practicability and the jester's little fling, Dr. Edward Everett Hale's proposition is not only founded on a right theory, but reflects the very way in which nature, says the *Chicago Journal*, first taught the great lesson of altruism and love.

Most of our scientists and some of our religious teachers nowadays believe that man ascended from the beasts. If he did, the first kindness, the first unselfishness, the first compassion for the helpless, and gentleness toward the weak, that were ever in the world, the first things that ever differentiated man from brute, were taught to the parents of the race in exactly the way Dr. Hale would have them taught to its children.

There never was any human love until there was human helplessness. There never was any mother-love or father-love until children began to be born that were feeble.

In some of the lower orders of life the young can take care of themselves as soon as they are born. There is no reason why anything should "care for" them, so nothing does. There is no affection for them nor from them nor among them.

Love was first excited by something that needed care and kindness. A couple of shaggy savages, animals that didn't know enough to love each other yet, felt something "akin to pity" for an ugly baby with a gorilla chin and no forehead, and resolved to do something not for themselves, but for the hideous infant, and not because they were proud of its prettiness and wanted to keep it for a plaything, but because it so obviously needed to have something done for it.

That, the scientists tell us, was the beginning of unselfishness, the beginning of care for others, the origin of affection and altruism, the genesis of humanity, the promise of the destiny of man. The baby was the animal pet that got into the schoolhouse with the children of the early world and taught the first lesson of love. On its mighty weakness hung most of those powerful and wonderful forces that have lifted brutehood into manhood.

Heredity does a great deal, but most of the lesson has to be taught over to every individual, and it is a more important one than geography or grammar. Humanity's happiness and further progress depend on the thoroughness with which it learns the lesson, not of arithmetic or spelling, but of altruism.

Children are cruel. But they have hereditary instincts of kindness for the weak that would develop the sooner into love for their fellows if they had something helpless to exercise them on. When a big, hulking, selfish boy begins to take a protecting interest in a little yellow dog he is unconsciously teaching himself the greatest lesson he can ever learn. Trotting around in that woolly hide, dodging stones, fleeing to him for protection from the poundman, getting lost, and kicked, starved, and hurt, is the beginning of the boy's unselfishness and the man's altruism, and it is not funny, but sad, that the schoolhouse door must shut it out so that the reluctant master may the better give his attention to the mysteries of commercial arithmetic and the art of skinning his fellow-man by means of "brokerage," "discount," and "compound interest."

Dr. Hale may never see animal pets in the schools, but he has been in the world a long time, and knows what humanity needs.

BAILEY'S DICTIONARY.

C. C. MARBLE.

THIS may be called the age of dictionary making. All philological scholarship seems to culminate in historic derivation. Without referring invidiously to cultivated foreign languages, each of which has many such monuments of elaborate, accurate, and patient research, it may be said with confidence that the English language is unrivaled in its lexicographers, who at the close of the nineteenth century have completed works which only a few decades ago were not thought of as possible. Dr. Johnson prepared his unabridged dictionary in seven years "with little assistance from the great," an achievement which at the time excited wonder and admiration, though insignificant indeed in comparison with present performances. And yet there may be some doubt about the comparatively greater usefulness to the general reader of the bulky volumes of the modern publishers. In illustration the reader might find an analysis of one of the oldest English dictionaries an interesting example.

For several years I have had at hand "An Universal Etymological English Dictionary and Interpreter of Hard Words," by N. Bailey, 1747. On almost all occasions when I have needed to consult a dictionary I have found it satisfactory, some of its learning, on account of its very quaintnesses and contemporaneous character, being better adapted to a particular definition than modern directness. Perhaps its greatest defect is the absence from it of scientific terms, of which, however, there were very few at that time.

The introduction is exceedingly learned and the causes of change in language are discussed with much ingenuity. Many examples of Saxon antiquities are given, one of which, the Lord's prayer, written about A. D. 900, by Alfred, Bishop of Durham, we may quote, from which "it doth appear," says Bailey, "that the English Saxon Language, of which the Normans despoiled us in great Part, had its beauties, was significant and emphatical, and preferable to what they imposed upon us." Here is the prayer:

"Our Father which art in Heavens, be hallowed thine name; come thine Kingdom; be thy will so as in Heavens and in Earth. Our Loaf supersubstantial give us to-day, and forgive us Debts our so we forgive Debts ours, and do not leâd us into Temptation, but deliver us from Evil."

The introduction is in Latin. Greek, Hebrew, and Saxon characters are used in the definitions. Bailey defines the meanings of proverbs with far more particularity than is necessary, perhaps, and yet a small volume could be made up of these curious "common or old pithy sayings," as he defines them, many of which are obsolete or unknown to the readers of the present day. Instance:

"As sure as God's in Gloucestershire." This proverb is said to have its rise, on account that there were more rich and mitred abbeys in that than in any two shires of England beside; but some, from William of Malmsbury, refer it to the fruitfulness of it in religion, in that it is said to have returned the seed of the gospel with the increase of an hundred fold. And "Good wine needs no bush." This proverb intimates that virtue is valuable for itself, and that internal goodness stands in need of no external flourishes or ornaments; and so we say "A good face needs no band."

One other, a short one: "All goes down gutter lane." This is applied to those who spend all in drunkenness and gluttony, alluding to the Latin word gutter, which signifies the throat.

Not a few of these proverbs, with their explanations, occupy whole pages of the dictionary, and where they are traced to the Greeks or the Hebrews the original characters are brought into use as incontestable evidence of their

authenticity. Definitions are numerous of words which, while perfectly legitimate and of Saxon origin and of common usage in the age of Elizabeth, are omitted at the present day from lexicons in deference to the prevalence of a more delicate taste.

The book contains about one thousand pages, is printed in a style little dissimilar to present unabridged dictionaries, and must have been of prodigious assistance to the author's successors. He does not deprecate the labors of his predecessors, whom he acknowledges to have saved him much trouble, but he claims to have omitted their redundancies in order to make room to supply their deficiencies to the extent of several thousand words, "in no English dictionary before extant," and that he is the first who attempted an etymological part.

This very important contribution to English literature—far more important then than any similar performance could be now—is, strange to say, nowhere mentioned in what is regarded as the best history of English literature. And just here the remark might be appropriately made that omissions of this kind in standard literary histories and cyclopædias go far to call in question the qualifications of the editors. A word may be overlooked or forgotten, but a scholar who has contributed substantially to the growth and enrichment of a great language deserves a better fate.

STELLER'S JAY.

(*Cyanocitta stelleri.*)

The jay is a jovial bird—Heigh-ho!
He chatters all day
In a frolicsome way
With the murmuring breezes that blow—
Heigh-ho!

Hear him noisily call
From the redwood tree tall
To his mate in the opposite tree—Heigh-ho!
Saying, "How do you do?"
As his topknot of blue
Is raised as polite as can be—Heigh-ho!

Oh, impudent jay,
With your plumage so gay,
And your manners so jaunty and free—
Heigh-ho!
How little you guessed,
When you robbed the wren's nest,
That any stray fellow would see—Heigh-ho!

THIS is an abundant and interesting cousin of the bluejay and is found along the Pacific coast from northern California northward. It is a very common resident of Oregon, is noisy, bold, and dashing. The nest of this bird is built in firs and other trees and in bushes, ten to twenty feet from the ground. It is bulky and made of large sticks and twigs, generally put together with mud, and lined with fine, dry grasses and hair. The eggs are three to five, pale green or bluish green, speckled with olive-brown, with an average size of 1.28x.85. There seems no doubt that many jays have been observed robbing nests of other birds, but thousands have been seen that were not so engaged. It has been shown that animal matter comprises only about twenty-five per cent. of the bird's diet.

LINEN FABRICS.

W. E. WATT, A. M.

WE HAD just taken that delightful ride down the rapids of the St. Lawrence, and experienced the thrill of mingled pleasure and fear which everyone has at the moment when the vessel is dashing at a furious rate directly towards a great rock, and we were sure that someone had made a mistake for once, and no power could save us from being dashed in pieces, when a sudden whirling current of the stream picked the ship out of the way of the rock and carried her safely through the boiling foam into a place of comparative safety.

As we stood among the seagoing shipping of the port of Montreal we could easily understand why there should be such a great city there. We took but little stock in what had been said of the great business enterprise of the early settlers of that town and how they built up the place till it became a great seaport and an important commercial center. No doubt they were able and enterprising men, but Montreal was made by nature the greatest and most important seaport of Canada by the peaceful deep river and its formidable rapids. Since no ships can sail up those rapids the boats that came from Europe and all over the earth were obliged to tie up there and discharge their cargoes.

Wherever there is a ledge of rock to stop the coming up of vessels from the sea there is always an important town to receive what those ships bring and to distribute it over the country round about.

We went aboard a ship that had just come in from France loaded with cases of wines. As the wines were being carried ashore at some of the gangways loads of something else were being brought aboard at others. This stuff was done up in sacks longer than a man and very heavy. It took several men to handle a sack. They were so careless about it that we wondered that they did not fear breaking the contents of the sacks. Then we wondered more what sort of stuff could be shipped to Europe in such sacks and in such great quantities. We inquired; and it took some little time to make the inquiry, for the men who did the work spoke something that sounded like French, but our school French did not suit them. We could find no one at hand who spoke English. We learned that the sacks contained oilcake.

Linen has been woven since records of what man has done have been kept. Some historians claim that cotton is the oldest fabric, and give instances of old records of its use in India and China. Others claim woolen goods to be the oldest, and yet others claim the honor for linen. Whoever looks into the matter extensively will be inclined to give the credit to whichever fabric he studies most, but it is likely that the figleaf will be credited with the greatest age as a fabric by most people.

The seed of flax is ground fine, either roasted or raw, and placed under heavy hydraulic pressure. This brings out the oil, which is a very important article called linseed oil. The cake is valuable for feeding cattle and the oil is used in all kinds of painting where the painted surface has to stand against the weather. Most of the flax raised in America is cultivated for the seed mainly. In Ohio three pecks of seed are sown to the acre and from six to twelve bushels are harvested. There is also a ton or two of straw to the acre, which is used at the rope-walks and paper-mills. Linen paper is peculiarly valuable.

The mummies of Egypt were swathed in linen, and much of this cloth is now in an excellent state of preservation although at least four thousand years have sped since its manufacture. While Joseph was in bondage cloth was woven which is still in existence.

There was once some question as to whether certain mummy cloth was of cotton or linen. But that has been definitely settled by the use of powerful lenses. The microscope shows that a fiber of cotton is flat and curly like a ribbon somewhat crinkled, and, like a

fine ribbon, has a beautiful border which differs from the rest of the fiber. A fiber of flax has a glassy luster and is not flat like cotton, but rather like an extremely fine bamboo rod, cylindrical and jointed. When these facts were learned regarding the two fibers the cloth under suspicion was placed under the glass and showed unmistakably that it was round, transparent, and jointed. So there could no longer be any doubt that the ancient coverings of the dead in Egypt were all of linen with no mixture of cotton even when cotton was well-known.

The dead could not be buried in cerements of wool because there was a strict law against it, the wool being supposed to invite worms. The remarkable preservation of the cloth is largely due to the fact that it was well smeared with wax and asphaltum. But the fibers of flax resist decay to such an extent that in the ordinary process of preparing flax for spinning it is moistened and left exposed to such an extent that if it were as easy to decay as cotton it would become rotten before the time for spinning.

The earliest records of the business of preparing this useful fabric are those of the Egyptians as cut in stone on their ancient monuments. In their hieroglyphics and illustrations they have left us a complete representation of all their arts, and the processes of gathering flax, rotting off the bark and coatings of the fibers, cleaning the material by striking with clubs or whipping it against stones, straightening the fibers, twisting them into threads, and weaving cloth, are all beautifully pictured and described.

When William the Conqueror invaded England his wife Matilda made a record of the principal events of his life by embroidering upon a linen strip twenty inches wide and two hundred and fourteen feet long figures of the men, boats, animals, weapons, and other interesting objects, using woolen thread and depicting all with great clearness and accuracy. The Bishop of Odo assisted her husband at the battle of Hastings, and in remembrance of his kindness Matilda presented the work to the cathedral of Bayeaux. It is now preserved in the public library of that city.

Two hundred years ago there were spinning schools in Germany. The teacher sat with a wand in her hand and tapped the children near her when they lapsed into idleness, and when she noticed any of those at some distance from her not at work she rang a little bell for an attendant to enter and take the offenders out of the room for the purpose of punishment.

The old Dutch settlers in New York made what was called linsey-woolsey. This was a sort of cloth made with linen warp filled in with woolen woof. It was better than all-wool goods because it held its shape better and was stronger. This material was much worn by the early inhabitants of America, Abraham Lincoln being one of those who were well-satisfied with home-made garments of this fabric. Irving, in his "Knickerbocker's History of New York," claimed that some of the Dutchmen whose names ended in broeck were so-called because of some peculiarity pertaining to their breeches. For instance, Tenbroeck took his name from the rare distinction of his possessing and wearing at the same time ten pairs of linsey-woolsey breeches.

When people began to show their prosperity by purchasing cloth made up more beautifully than the product of the homestead loom they had to endure the remarks of others who affected to despise the man who was so extravagant as to care to dress in "store cloth." So recent is the use of this old-fashioned material that we find in one of Louisa Alcott's essays to girls the statement that "Modesty is as sweet in linsey-woolsey as in linen."

The greatest country in the world for the production of linen of the best quality is Ireland. Flax there reaches a height often exceeding two feet and the soil and climate seem to be the very best for maturing the fiber and manipulating it when gathered. In traveling through the country I saw a great deal of what at first glance seemed to be some sort of grain lying on the ground spoiling in the rain. I soon realized that this was flax and that it was left out on the ground purposely

to give the pulp and bark a chance to rot away from the fiber.

Dew-retting is letting the flax lie in the heavy dews of Ireland till the work is done. Soil on which flax is raised is rapidly made poor unless the richness that is taken from it in the flax is restored to it in some way. Most of this richness is in the seed and the part of the stalk that is removed in the retting. Where this gets back to the soil there is little else to be added. Sometimes the flax is retted in small pools and the water saved to put upon the ground, though the flax is more discolored by this process than where the work is done in running water. Recently steam heat and vapor have been used to soften the stalks, and then the air pump draws the pulp away from the fiber, so that what once took several weeks to do is now done in a few hours. By the old process the fiber was sometimes left stacked dry for years with constant improvement in quality.

The Irish people, who are so proud of their island, point with additional pride to what some of their linen towns have done. As we were riding past the little village of Bessbrook a clergyman took pains to point out to us the evidences of thrift. He said that town lacked three p's that are very troublesome to other towns all over the world. They were the pawnshop, the public house, and the police. The good character of the people made these entirely unnecessary for their town. But these good qualities are not universal there, for in some of the larger places intemperance is remarkably bad.

We saw the work in all its stages at Belfast. Queen Victoria gets her table linen from that city, and we saw several pieces in the loom that had the royal arms upon them. To get the finest fabric the fiber is kept moist in both spinning and weaving. Nothing can be more beautiful than the silky, transparent stuffs made there. Dry spinning is done where a coarse and heavy grade of goods is desired. American visitors in Ireland, especially the gentlemen, plan to bring home as large a quantity of linen collars, cuffs, and handkerchiefs as the customs officers will allow to pass at New York free of duty.

The finest linen goods are called lawns, and this name is a modification of the French word *linon*, which sounds much like lawn when spoken properly. The French make many fine articles from all sorts of fibers, and seem to have recovered from the blow to their industries which came on the revocation of the Edict of Nantes. Some writers claim that nearly half a million skilled workers in fabrics left that country in the years around 1688.

While the battle of Waterloo was raging near Brussels and the people of rank were so strongly affected by the thunder of the guns of all Europe there were thousands of women, young and old, in that city and within hearing of the great contest who kept right on with their work, making laces. They knew somebody would win the day, and there would be a market for all sorts of finery, and the linen laces of Belgium were of much importance to society. There are many kinds of laces made in Brussels, but the kind you most see as you pass along the streets is that being made on little cushions by women sitting before their shops and houses with one eye upon their work and the other on those who are passing, hoping to get an American to pay a large price for something that he thinks he has seen made. It is not an unheard-of thing for an American to buy of one of these attractive lacemakers lace that came from the machines of Nottingham, England, for machine-made lace is much cheaper than that made by hand.

Pillow lace was probably invented by Barbara Uttmann, in the middle of the sixteenth century. She lived in St. Annaberg, Germany, and was a woman of great natural ability. She was highly honored by the Saxons, who state with pride that when she died, at the age of sixty, she had seen sixty-four of her own children and grandchildren.

Point lace of the old sort was the highest form of needle art. Holy men of old gave their lives to architecture, believing they could give glory to God by work in stone beautifully carved

and set in the walls of monasteries and cathedrals; so it happened that in the thirteenth century the works of their hands reached the highest point in architecture. So beautiful is their work even now that those who have studied the subject but little know the date of a building when they see its windows. But a century later the nuns had done something of the same sort. They had produced from the fine fibers of flax marvelous designs of fleecy lace fabrics that were the wonder of Christendom. Their art was buried with them. A point lace is made to-day, but it is far from the excellence of the original work, which was a constant prayer of those who gave their lives to the making of it.

A Yankee boy of twenty, Erastus Bigelow, thought it would be a good thing to try to invent a way of making coachlace by machinery. In forty days he was producing lace at three cents a yard which had cost twenty-two cents. Then he invented a loom for ingrain carpets; this made eight yards a day instead of three that the looms of the time made. In making Brussels carpet he made his chief triumph. Seven yards a day was considered a good day's work, but he made a machine that produced twenty-five yards of much better quality in the same time. He received one hundred thousand dollars for his patents. The body of Brussels carpet is built on a foundation of linen.

THE SYCAMORE WARBLER.

BELLE P. DRURY.

THE last winter was one of unusual severity in the south, as well as elsewhere. The cold continued until rather late in the spring and caused the death of numbers of birds that came north too soon. One day the last of March a sycamore warbler flew in at the open door of a cottage in the Indian Territory. It settled familiarly on the dining-table, picking up crumbs from the cloth. It seemed cold and almost famished, having arrived too early from its winter haunts in Mexico or Guatemala. After satisfying its hunger it flew about the room, and presently, instead of flying out, it dashed its breast against a mirror and dropped to the floor, quite dead. The blow could scarcely have caused death except for the bird's exhausted condition. I picked up the wee creature to examine its pretty coat. How dainty each ash-gray feather! Some were tipped and some marked with white. The throat had a tinge of yellow; then two colors giving the extra names of "white-browed" and "yellow-throated" warbler. This bird frequents marshy lands where sycamore trees flourish. It loves to build its nest in the topmost boughs, safe from all enemies. Here the male, screened from view, sings his song, which resembles that of the indigo bunting, but with a different modulation. When the days became warm I often saw a happy pair of them, busy, I supposed, in building, but the nests were too high for inspection.

FROM COL F. NUSSBAUMER & SON

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RUDDY DUCK

½ Life-size.

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THE RUDDY DUCK.

(*Erismatura rubida.*)

FEW, if any, ducks have so many popular names as this species, which is known as spine-tailed, heavy-tailed, quill-tail coot, stiff-tail, bristle-tail, sleepy-duck, sleepy coot, fool-duck, deaf-duck, shot-pouch, daub-duck, stubble-and-twist, booly-coot, blather scoot, hickory-head, greaser, paddy, noddy, paddy-whack, dinkey, hard-tack, etc., according to the locality or the particular individual who is asked to name the species. It has characteristics which justify the use of any one or all of these names. Its range is the whole of North America, which extends south to Guatemala and Colombia, Cuba and other West Indian islands. Probably no North American duck has so extensive a breeding-range as the present species, since it breeds as far south as Guatemala, perhaps even farther; as far north as Great Stone Lake, York Factory, and other localities in the sub-Arctic portions of the continent, and from the Atlantic to the Pacific. According to Professor Cook it winters from southern Illinois southward. This duck seems to be equally fond of salt, brackish, and fresh water. In the Southern states it is found in great flocks. Its flight is rapid, with a whirring sound, occasioned by the concave form of the wings. It rises from the water with considerable difficulty, being obliged to assist itself with its broad webbed feet, and for that purpose to run on the surface for several yards. From the ground, however, it can spring up at once. It swims with ease and grace, is expert at diving, and when wounded, often escapes in this way, hiding in the grass if there is any accessible. The locality usually selected for a nest is some deep, sluggish stream, lake, or pond, and the nests are always built close to the water's edge, being composed of reeds, dry rushes, and grass. The structure is often made so that it will float, similar to a grebe's nest. It is asserted that this bird prefers the abandoned nests of coots for nesting purposes to those constructed by itself. The eggs appear large for the size of the bird; they are grayish white, oval in shape, with a finely granulated surface; sizes range from 2.35 to 2.50 long by 1.70 to 1.80 broad. Audubon says that the adult female in summer presents the same characteristics as the male. He describes the male one year old as having a similar white patch on the side of the head; upper part of head and hind neck dull blackish brown; throat and sides of neck, lower part of the neck dull reddish brown waved with dusky; upper parts as in the adult but of a duller tint, lower parts of a grayish white.

WINGS.

Wings that flutter in sunny air;
Wings that dive and dip and dare;
Wings of the humming bird flashing by;
Wings of the lark in the purple sky;
Wings of the eagle aloft, aloof;
Wings of the pigeon upon the roof;
Wings of the storm-bird, swift and free,
With wild winds sweeping across the sea—
Often and often a voice in me sings—
Oh for the freedom, the freedom of wings!

—*Mary F. Butts.*

I KNOW NOT WHY.

I lift mine eyes against the sky,
The clouds are weeping—so am I;
I lift mine eyes again on high,
The sun is smiling—so am I.
Why do I smile? Why do I weep?
I do not know, it lies so deep.
I hear the winds of autumn sigh.
They break my heart, they make me cry.
I hear the birds of lovely spring,
My hopes revive, I help them sing.
Why do I sing? Why do I cry?
It lies so deep I know not why.

—*Morris Rosenfeld.*

THE BRAVE BOAR.

ELLA F. MOSBY.

"Upstairs, downstairs,
And in my lady's chamber,"

THE French chronicles of the reign of Francis I. tell the following wonderful story of a boar hunt: "'Twas in a grand forest that stretched for miles around a castle—an old-fashioned castle of ramparts and towers, of wide halls and winding stairways.

Oliver, the twelve-year old son of the master of the castle, had set his heart on going with his father to hunt the wild boar with the gentlemen of the neighborhood. The forest was the home of a great many wild creatures, great and small. Squirrels and hares lived there; wide-antlered stags and timid does with their young fawns beside them, foxes, boars that feasted on the black acorns and chestnuts that covered the ground, and fierce gray wolves, seen chiefly in winter The boars were the fiercest of all, even the sows would fight for their young ones, and there was one old boar who was by this time quite famous for his courage, his cunning and his great age. He was called Pique-Mort, which means death-thrust, because he had in his savage onslaughts fatally wounded so many men, horses and dogs.

"Oliver's father had ordered the great hunt against this very old warrior, who, by the way, had grown so shrewd that he could not always be roused from his secret lair even by the beaters and prickers who went ahead of the hunters. But he surely would appear to-day. The forest was ringing with horns and bugles, the neighing of horses, the baying of noble hounds, the hallooing and joyous clamor of the sportsmen.

"Oliver was well prepared for the occasion. Old Bertrand had taught him all the calls and recalls on bugle and horn, had trained him to thrust with the long boar-spear, and to use the short, thick sword kept for the last when the brute was near, and the big boar-hounds Vite-Vite, and the others, turned and obeyed his voice when it rang out in its clear, boyish treble. Most important of all, his mother had consented to his going.

"But alas, and alas! when the morning dawned fair and sweet, poor Oliver was racked with grievous pain and burning with fever! The chase swept away with shout and cry and bugle-blast, and Oliver barely heeded it or turned his head when his father called back: 'We'll bring old Pique-Mort home with us.' However, by the afternoon the fever had slackened, and the pain abated, and Oliver lay white and weak on his couch, and with piteous tears on his cheeks over the mischance that had held him fast at home. He turned his face to the wall in a burst of passionate grief as they heard, at first far off, and then nearer and nearer, the excited yelps of the dogs, then the trampling of horses, the hoarse cries of the men, and oh, the bugle!—note of 'La Mort!' which meant victory over the famous boar!

"'Oliver,' said his mother tenderly,—and then all at once came a sound at which both started, and threw their arms about each other. In the hall below, up the stairs, came a heavy creature, panting, snorting, and the furious Pique-Mort suddenly burst upon their amazed vision! Sinister and savage did he look, the little, round greedy eyes red with rage, the bristles standing up like a cuirass, the sharp and cruel tusks ready for assault, and foam and blood churned at their base into a streaked froth by his heat and anger. He was within the chamber. Oliver's arm dropped nerveless at his side, and his frightened eyes sought vainly for any weapon.

"The mother had a quicker wit, and stooping down, she seized with both arms a large Eastern rug, and threw it

over the beast's head, blinding him for the while, as well as blunting the thrust of the terrible tusks. As he struggled desperately in its smothering and heavy folds, the whole following—dogs, men and the master at their head, were up the stairs also, and the death-stroke was quickly given. It was the end of the veteran of so many chases in morass and thicket—Pique-Mort was dead.

"After a moment's half-stupefied stare, the lord of the castle broke forth:

" 'Well, my boy, you were at the finish after all.' The dogs could not be held off their old foe, and the brave boar was furious at their baiting, and so broke away. My lady, you have the glory, and Oliver his wish.'

"Old Bertrand stroked his grizzled beard.

" 'Twas a gallant brute,' he said. 'Had he been a man they would have styled him *hero*. He had a high courage and loved freedom well.' "

We have grown since those rough days into more compassion for animals, but even yet we are not altogether just to their side of the question, to the recognition of their right to life and its joys as their merciful Creator has given it to them.

GETTING ACQUAINTED WITH THE TEACHER.

JESSIE P. WHITAKER.

IN the summer of 1897, wandering in the woods of Pigeon Cove, on the outer point of Cape Ann, the prolonged call of a bird often came to my ears, which aroused my curiosity. I was not then much acquainted with birds, but was beginning to "take notice" and usually carried my field glass on my walks, and if I saw or heard a bird unfamiliar to me, tried to look him up in my books. I had with me "Our Common Birds and How to Know Them," by John B. Grant; also Florence Merriam's "Birds Through an Opera Glass"—very good books to aid beginners in identifying birds. The call of which I speak was so marked and so often repeated that I eagerly searched for the bird, but could not get a glimpse of him, nor even locate the sound accurately.

I soon perceived, however, that it was a regular chant, increasing in an even crescendo, vibrating through the woods. I remembered reading descriptions of such a call in the books, and soon found my bird to be the oven-bird, golden-crowned thrush, or teacher bird.

But why "teacher" bird?

I was constantly asking this question, for to my ears the sound always came as *ti chee*, *ti-chee*, *ti-chee*, with accent always on the final syllable. By no exercise of the imagination could I make it sound like "teacher." Never during that summer nor during the two succeeding summers have I heard these birds at Pigeon Cove say "teacher."

The little brown walker kept out of my sight very persistently during that first summer, but in September, walking in the woods near Star Lake in the Adirondacks, I had a good, near view of two little olive-green birds walking on some low branches. Their white speckled breasts proclaimed them thrushes, while the beautiful crown of brownish orange inclosed in lines of black, plainly marked them the "golden-crowned." Often as I have seen the bird since, his golden crown has never appeared as conspicuous as it did on that September day by the mountain lake. But I had to go to Skaneateles Lake in central New York to hear him say "teacher." On a May morning in in 1899, sitting on a mountain side overlooking this beautiful sheet of water, the chant of a bird came vibrat-

ing through the woods to my ears, *teach-ah*, *teach-ah*, *teach-ah*, *teach-ah*, *teach-ah* very distinctly.

Accent clearly on the first syllable this time.

Ah! Mr. Burroughs, at last I have found your little "teacher."

Will anyone tell me *why* this bird with olive back and speckled, thrush-like breast, is placed in the family *Mniotiltidæ*, or wood warblers, instead of with the *Turdidæ*, or thrushes? And why is the "water thrush" also classed with wood warblers, when his olive back and speckled breast make him seem almost a twin brother to the oven bird, while both are so unlike other members of the warbler family, and so much resemble the true thrushes? It was at Glen Haven, beside a mountain brook tumbling down into Skaneateles Lake that I had my first and only view of a water thrush.

His clear song, repeatedly ringing out above the noisy music of the brook, kept luring me onward and upward over the rough banks, till at length I saw the little walker peering about among the stones for his food. Another bird closely resembling the thrushes and bearing the name, yet placed in *another family*, is the brown thrasher, or thrush. I look in my book for his classification. Family *Troglodytidæ*! I can scarcely believe my eyes! Can any one give me any earthly reason *why* the ornithologists in their wisdom have seen fit to place this bird, with his reddish brown back, speckled breast and beautiful thrush-like song, in the same family with catbirds and wrens? Truly the mysteries of ornithology are past my comprehension.

To return to our "teacher." My acquaintance with him has not yet advanced to the stage of finding him "at home" in his dwelling. As Neltje Blanchan says, "it is only by a happy accident" that one might "discover the little ball of earth raised above the ground, but concealed by leaves and twigs and resembling a Dutch oven, which gives the bird its name of "oven-bird." Last summer at Pigeon Cove the warning cries of a mother-bird led me to suspect a nest, but I failed to find it. The brood had evidently left their home, for a sudden loud outcry from the mother-bird startled me as the little thrushes scurried out of the path from almost under my feet, while Madame Thrush fluttered about with a pretense of a broken wing to distract my attention. Her "trailing" was quite effective, for by the time I had turned my attention from her performance to the babies, they were quite out of sight.

THE MUSKRAT.

(*Fiber Zibethicus.*)

THAT part of North America which is included between the thirtieth and sixtieth parallels of north latitude is the home of this species of muskrat, which is the most numerous of the family. It is most plentiful in Alaska and Canada, which are so rich in lakes and rivers. It is described as a large water mole, with a long tail, broad hind paws, a blunt snout, and short, hair-covered ears, which may be closed to exclude water. The fur is close, smooth, soft, and lustrous, the woolly under fur being extremely delicate, fine, and short; the outer coat has a strong luster, and is double the length of the former. Adult males attain a total length of twenty-three inches, the tail occupying about half of this. Grassy banks of large lakes or wide, slowly flowing streams and swamps are its favorite haunts, though it is frequently seen about large ponds, grown with reeds and aquatic plants, where it erects a permanent home and dwells either in small colonies or communities of considerable numbers. The mode of life

of a muskrat is in many respects like that of the beaver, for which reason the Indians call the two animals brothers, and affirm that the beaver is the older and more intelligent of the two. The burrows of the muskrat consist of plain underground chambers, with several tunnels, all terminating under water, or of strongholds above ground. These are of a round or dome shape, stand on a heap of mud, and rise above the surface of the water. They are lined with reeds, reed grass, and sedge, cemented with mud; the interior of the "lodge" contains a single chamber from sixteen to twenty-four inches in diameter. A tunnel which opens beneath the water leads to it. In winter it lines its chambers softly with water lilies, leaves, grasses, and reeds, providing for ventilation by loosely covering the center of the dome-shaped roof with plants, which admit a sufficient quantity of fresh air and let the vitiated air out. As long as the pond or swamp does not freeze to the very bottom it is said to lead a highly comfortable existence in its warm habitation, which is often protected by a covering of snow. Some observers say that the food of the muskrat consists almost wholly of aquatic plants, but Audubon saw captive muskrats which were very fond of mussels. They are very lively, playful creatures when in the water. On a calm night many of them may be seen in a mill-pond or some other sequestered pool, "disporting themselves, crossing and recrossing in every direction, leaving long, glittering ripples in their wake as they swim, while others stand for a few moments on little tufts of grass, stones, or logs, from which they can reach their food floating on the water; others sit on the banks of the pond and then plunge one after the other into water like frogs."

From three to six young are born in a burrow. If caught young they are easily tamed, and are of an equable and gentle disposition. Although some people dislike the fur on account of the odor of musk which clings to it for a long time, it is often used for trimming clothing or in the manufacture of collars and cuffs, especially in America and China. The best pelts are deprived of the long outer fur, dyed a dark brown color and used as a trimming which resembles sealskin. The animal is caught in traps baited with apples. The Indians know exactly which "lodges" are inhabited; they only eat the flesh, as the odor does not seem to be disagreeable to them.

"NOT A SPARROW FALLETH."

GRANVILLE OSBORNE.

NO traveler in Palestine, the land of sacred memories, will need an introduction to the sparrows. They are as tame, troublesome, vivacious, and impertinent, as their numerous progeny across the seas. They chirp and twitter, asserting their rights of possession in places where they are not welcome, industriously building their nests in every available nook and corner, and defending them fearlessly against every feathered encroacher. They stop up the stove-pipes and water-gutters with their rubbish, build nests in the windows, and under the eaves of the roofs, and have not the least reverence for any place or thing. You see them perching on the loftiest spires of the Holy City, flitting in and out of minaret and tower, wherever an opening invites them to a place of security and shelter for rearing their young. They nest in great numbers in the bushes on the banks of the River Jordan, and band together in defending their nests against the

rooks and crows that infest the canebrakes north of Lake Hulah. They live on terms of great amity and friendliness with the beautiful "wŭr-war" or bee-eater, which burrows in the soft earth-banks near the out-go of the Jordan, from the Lake of Galilee. The nests of sparrow and "wŭr-war" are so numerous and easy to reach that one might easily gather a peck of their tiny eggs, and unfledged nestlings, with mother-bird and all, could they be of use. But the Mosaic Law has a precept especially intended to protect the "birds of the air." In one portion of the inspired text he writes: "If a bird's nest chances to be before thee in the way, in any tree, or on the ground, whether they be young ones or eggs, and the dam sitting upon the young, or upon the eggs, thou shalt not molest the dam with the young, that it may be well with thee, and that thou mayest prolong thy days." You will notice how clear is the precept by which we are forbidden to molest these nests. We *must* not, the biblical law says, and to the obedient is the promised blessing of prosperity and long life, with contrary calamities clearly implied to those who transgress. In its meaning this precept includes all birds, and was intended, like many other prohibitory commands, to cultivate sentiments of humanity and habits of gentleness. And so it is that in Bible lands the sparrow is more numerous, and less liable to destruction, than in our own streets, fields and parks, where every bird of this species is an object of contempt, and often lured to its death, with countless thousands of victims, unsuspecting and easily taken like himself.

They flit over the "field of the Shepherds," and build nests in the "cave of the Nativity." They cover the fields of wild oats by thousands, and chirp and twitter on the hillside where "Ruth went down to glean." A colony will be found in every old tree on the Mount of Olives, and even in the "garden of Gethsemane," they nest in perfect security above the heads of the black-robed attendants, who are on terms of great familiarity with them. The first reference to the sparrow in the Bible is an allusion to this habit of the fearless bird in building its nest in the most sacred places. It recalls the sad and pathetic period in David's life, when he fled from Jerusalem pursued by the army of his son Absalom, "who sought his throne and life." Afar from Jerusalem, and the temple courts, where he led the people in their devotions, his heart longed for the peace and holy calm, to be found only within their sacred enclosures, and he says: "A day in thy courts is better than a thousand." "My soul longeth for thy courts." "The sparrow hath found a nest for herself where she may lay her young, even thine altars." Thus he, the great King David, wished for the rest and peace enjoyed by the humble birds which he had observed so often, ministering to their young about the holy altar itself. Again, when Absalom falls in battle, and word is brought David, in the sadness of his lament, "O, Absalom, my son, my son!" He compares himself to the tiny, despised bird, saying: "I watch and am as a sparrow, alone upon the housetop." He had, no doubt, often seen the sparrow, when one had lost its mate, sitting on the housetop alone, and lamenting hour after hour its sad bereavement. So again the *sparrow* is honored above its fellows, and its affectionate devotion immortalized. But a "Greater than David," has drawn from this humblest one of the feathered tribe, a lesson of trust which has touched tenderly, in all ages since, the heart of every seeker after truth. "Not a sparrow falleth" is a sentence that comes very close to the human heart. "Not a sparrow falleth to the ground without your Father. Not one of them is forgotten of Him. Fear not, therefore. *Ye* are of more value than many sparrows."

"Not a sparrow falleth,"
How sweet the words and true
"Without your Father's notice,"
Who careth still for you;
O tiny bird, so trustful,
Teach me such trust as thine,
That so the wondrous lesson
I may possess as mine.

THE TREATING OF WHITEY.

BERTHA SEAVEY SAUNIER.

HIS coat was thin—so thin that his skin showed through in patches. And the skin was thin—so thin that the bones almost pricked through in a mute appeal to the public.

He walked the streets until his four little feet dragged with weariness and he often sat down upon his haunches to rest.

When he stopped people noticed him and many turned as they went past, watching him—he was so pitiable a sight.

"Mangy dog," somebody said, but he was more than that. He was lost and he was starving. He was so needy that he had forsaken his alley haunts and had come up to the boulevards where was greater prosperity, sunshine, cleanliness, and perhaps love toward man and beast.

In his walks he chanced near the lake and paced the viaduct that leads out upon the pier. He even went on the pier and looked down into the dark water as many despairing men and women have looked. It seemed easy to fall in, but he turned back and walked away. He had learned that if he kept moving the police and guards did not poke at him with their clubs.

In crossing Michigan avenue he had to watch his chances, for the rubber tires of the carriages made no warning sound on the asphalt. And then he came to Wabash—the noise of the elevated and surface trains, and of the trucks and drays was so confusing that he had need of more care than ever. At length he reached State street and sat down to rest.

Lizzie and Mattie were there before him. They, too, were acquainted with alley ways, though they were not personally acquainted with Whitey. Evidently they had found nourishment there that Whitey had missed, for Lizzie was decidedly fat and Mattie was fairly presentable.

Lizzie wore a faded worsted skirt poorly joined to a cotton shirt-waist with a green silk belt. Her short, fair hair was curled and tied with a green ribbon and her airy straw hat was bright with flowers. Other little girls of better fortunes had worn the things and had extracted their freshness and much of their beauty. But Lizzie felt quite dressed up beside her friend who wore only a simple calico gown and plain straw hat. She led Mattie from window to window, pointing out precious articles and rare jewels, quite as if she had purse connections with them.

The girls glanced at Whitey as he passed.

"Poor little dog!" Mattie said.

"Yes," returned Lizzie, "I should think the policeman would shoot him."

"Why?" queried Mattie in surprise.

"Oh, he's so bad off."

Whitey was moving slowly. He was rested and he thought to go on.

Somebody in a confectionery store noticed the girls.

"Mamma, I do believe that's my old belt that I threw in the rags one day, for there's the cross I made on it at school with ink."

"Nonsense," said the lady.

"And, oh, mamma, look at the poor dog!"

Of all the people who were passing four at least were interested in Whitey. Alley and avenue—but the alley folks first forgot him. They went back to their diamonds.

Whitey's troubles had made him meek and humble. He did not at this time expect anything and he was out of hopes and plans. He did not observe any whisperings at the portals of the big store nor see the wonder on the face of the porter. What he did see presently was a round pasteboard box that the porter set down under his very nose. It was torn a little at one side and what was in the box began to melt and run down to the pavement.

Whitey moved his ears a little at the sight. It actually looked eatable. He doubted if it was, but he put out his tongue and touched it.

When Lizzie and Mattie turned again

they stood amazed. People were looking amused as they passed and many a heart was made glad and light. One could read it in their faces. An unusual kindness is a love-flash that makes life sweeter to all who get it in their eyes.

"I'll bet there's a quart there," said Mattie.

"No, there ain't nuther. I guess a sick dog couldn't eat a hull quart of ice cream—it's jest a pint."

"Look how he licks it up. My! I'll bet it's good!"

"He's a gulpin' to beat the band," returned Lizzie.

"He never hed it before, *I'll* bet."

"Or you nuther, Mattie Black."

"You can't talk much," answered Mattie.

By this time Whitey had cleared up his spread pretty thoroughly. Not a drop lingered in the circle at the bottom of the box and the pavement was dry.

Whitey walked over to the side of the building and lay down in the sun. He put his nose between his paws. His body was as thin and forlorn as ever, but away at the tip of his pink, shabby tail was a little, short-lived wag. It was the language of gratitude and hope. It had been absent for days—ever since he was lost. The little girl who had caused it was riding home in her carriage, but the alley folks took note of it and they were appeased. They no longer envied the dog.

As for Whitey, the rich cream worked its work. As he lay in the sun he felt new hopes and plans revive. Of a sudden he remembered a bakery where he had chanced to get some plate scrapings. He would go again. And go he did. His body and his hopes were alike nourished with his recent treat. Whitey actually walked over to the bakery alley with a decided and prolonged wag to his tail. The ice cream had placed it there. It really made the turning point for better times for Whitey.

THE POPPY.

(*Papaver somniferum L.*)

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy.

Sleep hath forsook and given me o'er
To death's benumbing opium as my only cure.
—*Milton, S. A. l. 630.*

THE opium-yielding plant or poppy is an herb about three feet in height; stem of a pale green color covered with a bloom. Branches are spreading, with large, simple, lobed or incised leaves. The flowers are solitary, few in number, quite large and showy. The four large petals are white or a pale pink color in the wild-growing plants. The fruit is a large capsule, one to three inches in diameter, of a depressed globular form. The seeds are small and very numerous, filling the compartments of the capsule. In spite of the general attractiveness of the plant, the size of the flowers and the delicate coloring of its petals, it is not a favorite at close range because of a heavy, nauseating odor which emanates from all parts of the plant, the flowers in particular. The petals furthermore have only a very temporary existence, dropping off at the slightest touch.

The wild ancestor of our familiar garden poppy is supposed to be a native of Corsica, Cyprus, and the Peloponnesian islands. At the present time it is extensively cultivated everywhere, both as an ornamental plant and for its seeds, pods, and yield of opium. It has proven a great nuisance as a weed in the grain fields of England, India, and other countries—something like mustard in the oat fields of the

Phytic L.
CAMBRIDGE, MASS.

FROM KŒHLER'S MEDICINAL-PFLANZEN.

POPPY

CHICAGO:
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central states. There are a number of forms or varieties of the cultivated poppy. The red poppy, corn poppy, or rose poppy (*Papaver Rhoeas*) is very abundant in southern and central Europe and in western Asia. It has deep red or scarlet petals and is a very showy plant. The long headed poppy (*P. dubium*) has smaller flowers of a lighter red color and elongated capsules, hence the name. The Oriental poppy (*P. orientale*) has very large, deep red flowers on a tall flower-stalk.

Various plants belonging to other genera of the poppy-family (*Papaveraceæ*) are designated as poppy. The California poppy (*Eschscholtzia Californica*) is a very common garden plant. It has showy yellow flowers and much divided leaves. Horn poppy (*Glaucium luteum*) is a rather small seaside plant, with long curved pods and solitary yellow flowers. The Mexican prickly poppy (*Argemone Mexicana*) is widely distributed. The pods and leaves are prickly, flowers yellow or white; the seeds yield an oil which is used as a cathartic. Spatling or frothy poppy (*Silene inflata*) is so-called because when punctured by insects or otherwise it emits a spittle-like froth. Tree poppy (*Dendromecon rigidum*) is a shrub six to eight feet high, with large, bright yellow flowers. Welsh poppy (*Mecanopsis cambrica*), a plant found in the wooded and rocky parts of western Europe, has sulphur-yellow flowers and is cultivated for ornament.

The use and cultivation of the poppy dates from very remote times. The plant was well known in the time of the eminent Greek poet Homer, who speaks of the poppy juice as a dispeller of sorrows (Odyssey, IV. l. 220). According to Plinius the word poppy (*Papaver*) is derived from *papa*, meaning *pap*, the standard food of infants, because poppy juice was added to it for the purpose of inducing sleep. The ending *ver* is from *verum*, meaning true; that is, this food was the true sleep-producing substance. Opium, the inspissated juice of the poppy pods, was apparently not known in the time of Hippocrates, only the freshly expressed juice being used. It is through Diocles Karystius (350 B. C.) that we obtain the first detailed information regarding the use of opium. Nicandros (150 B. C.) refers to the dangerous effects produced by this drug. Scribonius Largus, Dioscorides, Celsus, and Plinius gave us the first reports regarding the origin, production, and adulteration of opium. Plinius mentions the method of incising the capsules. The Arabians are said to have introduced opium into India. It appeared in Europe during the middle ages, but was apparently in little demand. It was much more favorably received in the Orient. In 1500 it constituted one of the most important export articles of Calcutta. India supplied China with large quantities of opium, at first only for medicinal purposes. It is said that the Chinese acquired the habit of smoking opium about the middle of the seventeenth century, and since then it has ever been the favorite manner of consuming it.

The poppy is cultivated in temperate and tropical countries. The opium yield of plants grown in temperate climates is, however, much less than that of the subtropical and tropical countries, though the quality is about the same. There are large poppy plantations in India, China, Asia Minor, Persia, and Turkey. As already indicated, the white-flowered variety is quite generally cultivated because it yields the most opium.

The plants are grown from seed, and it is customary, in tropical countries, to sow several crops each season to insure against failure and that collecting may be less interrupted. Plants of the spring sowing flower in July. The pods do not all mature at the same time; this, coupled with the sowing of several crops at intervals of four to six months, makes the work of collect- almost continuous. Before the pods are fully developed they are incised horizontally or vertically with a knife. Generally a special knife with two and three parallel blades is used. The blades of the knife are repeatedly moistened with saliva to prevent the poppy juice from adhering to them.

The incisions must not extend through the walls of the capsule, as some of the juice would escape into the interior and be lost. As soon as the incisions are made a milky sap exudes, which gradually thickens, due to the evaporation of moisture, and becomes darker in color. The following day the sticky, now dark-brown juice, is scraped off and smeared on a poppy leaf held in the left hand; more and more juice is added until a goodly sized lump is collected. These sticky, ill-smelling masses of opium are now placed in a shaded place to dry. The entire process of incising and collecting as carried on by the Orientals is exceedingly uncleanly. To the nasty habit of moistening the knife-blade with saliva is supplemented the filth of unwashed hands and the sand and dirt of the poppy leaves, which are added from time to time to form a new support for the juice as it is removed from the knife. In scraping the gum considerable epidermal tissue is also included. Each lump of gum opium contains therefore a mixture of spittle, the filth of dirty hands, poppy leaves, sand, and dust. In addition to that many collectors adulterate the gum opium with a great variety of substances. Dioscorides mentions the fact that even in those remote times adulteration of opium was practiced, such substances as lard, syrup, juice of lactuca, and glaucium being added. Modern collectors and dealers adulterate opium with sand, pebbles, clay, lead, flour, starch, licorice, chicory, gum arabic and other gums, figs, pounded poppy capsules, an excessive quantity of poppy leaves and other leaves, etc. After collecting and drying the peasants carry the gum opium to the market-places, where they are met by the buyers and merchants, who inspect the wares and fix a price very advantageous to themselves.

The present trade in opium is something enormous, especially in India, China, and Asia Minor. To the credit of the Chinese and the discredit of the English it must be said that in 1793 the former strenuously objected to the introduction of opium traffic by the latter. This opposition by the Chinese government culminated in the "Opium War," which led to the treaty of Nanking in 1842, giving the English the authority to introduce opium into China as a staple article of commerce. The reason that Chinese officials objected to the introduction of opium was because they recognized the fact that the inhabitants very readily acquired the habit of smoking opium. In spite of the most severe government edicts the habit spread very rapidly after the treaty referred to.

Gum opium contains active principles (alkaloids), to which it owes its peculiar stimulating, soporific, and pain-relieving powers. Of these alkaloids, of which there are about nineteen, morphine and codeine are undoubtedly the most important. The properties of gum opium represent therefore the collective properties of all of the alkaloids and are similar to the properties of the predominating alkaloids just mentioned.

Physicians generally agree that opium is the most important of medicines. Properly used it is certainly a great boon to mankind, for which there is no substitute, but, like all great blessings, it has its abuses. It is the most effective remedy for the relief of pains and spasms of all kinds. It will produce calm and sleep where everything else has failed. It finds a use in all diseases and ailments accompanied by severe pain, in delirium, rheumatic and neuralgic troubles, in dysentery, etc. It may be applied externally to abraded surfaces, to ulcers and inflamed tissues for the relief of pain. The value of opium does not lie so much in its direct curative powers as in its sedative and quieting effects upon diseased organs, which tends to hasten or bring about the healing or recuperating process. In some diseases the physician refrains from giving opium, as in fully developed pneumonia, since the quieting effect would diminish the efforts on the part of the patient to get rid of the inflammatory products accumulating in the air vesicles and finer bronchial tubes. In fact, the soothing effect is too often mistaken for a curative effect and the patient is neglected. The Roman habit of feeding children pap

mixed with poppy juice was a pernicious one. Many modern mothers give their sick and crying infants "soothing syrups," most, if not all, of which contain opium in some form, as tincture of opium and paregoric. Too often the poor, overworked mother, who cannot afford to consult a physician, will purchase a bottle of "soothing syrup" or "cough remedy" for her child because she knows it produces a quieting effect, which is mistaken for a cure, when in reality the incipient symptoms are only masked. Only a reliable physician should be permitted to prescribe opium in any form.

The harm done through the use of opium by the ignorant, abetted by the "inventors," manufacturers and sellers of the "soothing syrups" and "cough remedies," is insignificant as compared with the harm resulting from the opium habit, which is acquired in various ways. For instance, a patient learns that the opium given him relieves pain and produces a feeling of well-being; hence, even after recovering, he returns to the use of the solace of his sickness when he suffers mental or physical pain, and in time the habit is acquired. The scholar knowing its properties makes use of it to deaden pain and to dispel imaginary or real mental troubles. Any and all classes may acquire the opium habit, but the majority of opium-eaters are from the lower and middle classes. As with other vices, the predisposing cause is a lack of moral stamina. Women are more addicted to the habit than men. After the habit is once established it is practically impossible to break away from it.

Under the influence of the narcotic the opium-eater becomes mentally active, hilarious, and even brilliant. Thoughts flow easily and freely. In time the patient loses all sense of moral obligation; he boasts and lies apparently without the least trouble of conscience. As soon as the effects of the drug pass away he becomes gloomy, morose, despondent, and he will resort to any measure to obtain a fresh supply. The dose of the drug must be increased continually, until finally quantities are taken which would prove fatal to several persons not addicted to its use.

Opium victims take the narcotic in various ways. The Chinese and Orientals in general prefer to smoke the crude opium in special pipes. Europeans and Americans usually take it internally in the form of the tincture or laudanum, paregoric or the powder of the sulphate of morphine or codeine. Frequently a solution of morphine is injected under the skin by means of a hypodermic syringe. No matter how it is taken the effects are about the same.

The treatment of the opium habit consists principally in the gradual withdrawal of the supply of the drug and strengthening the weakened system by proper exercise and diet, but, as indicated, the habit, if once fully established, is very difficult to cure. While, as stated, most of the opium-eaters belong to the poorer and middle classes, there are a number from the wealthy idle classes and not a few from professional classes who are slaves to the habit. The brilliant and gifted De-Quincy was addicted to this habit and recorded his experience in his "Confessions of an Opium-Eater."

The capsules and seeds of the opium plant are also used. The capsules are collected at maturity, but while yet green, usually during the month of July. They are broken and dried in a shaded, well-ventilated place, and finally in a moderately warm place; they are then broken in still smaller pieces, the seeds shaken out and the capsule fragments placed in well-sealed glass or tin receivers. The seeds, which are known as maw seeds, are collected at maturity and placed in wooden boxes. The seeds yield an oil which is used much like sweet oil; artists also use it in mixing colors.

DESCRIPTION OF PLATE.—*A*, flowering plant, white variety; *B*, flower of red variety; 1, pistil and stamens; 2, stamen; 3, pollen grains; 4 and 5, pistil; 6, ripe capsule; 7, 8, 9, seed.

THE PRIMROSE.

PROF. WILLIAM KERR HIGLEY,
Secretary of The Chicago Academy of Sciences.

What can the blessed spring restore
  More gladdening than your charms?
Bringing the memory once more
  Of lovely fields and farms!

Of thickets, breezes, birds, and flowers
  Of life's unfolding prime;
Of thoughts as cloudless as the hours;
  Of souls without a crime.

—*Mary Howitt.*

AMONG the many beautiful blossoms to be found in the field, the forest, or the garden probably none have served to inspire the poet more than the primrose and its near relative, the English cowslip. Someone has said that "no flowers typify the beautiful more strongly than those of the primrose which, though showy, are delicate and seem inclined to retire to the shade of the plant's leaves."

These plants belong to the Primrose family (*Primulaceæ*) which includes twenty-eight genera and over three-hundred and fifty species. Nearly all are natives of the Northern hemisphere, some being found as far north as Greenland (the Greenland primrose). Some of the species are Alpine, and a few are found in the southern portions of South America and Africa. One of the most interesting wild species of this family is the shooting star or American cowslip, which grows abundantly on the prairies of the Eastern portion of the United States. Dr. Erasmus Darwin tells us that "the uncommon beauty of this flower occasioned Linnæus to give it the name *Dodecatheon*, signifiying the twelve heathen gods."

The family as a whole seems to have no economic value of importance and are of use to man simply to beautify his surroundings. Many of the species are very interesting to the scientific observer, for the structure of their flowers is such that they are peculiarly adapted for cross-fertilization. This character has made it possible for the floriculturist to produce many of the beautiful forms that are found in cultivation. The generic name of the primrose is *Primula* from the diminutive of the Latin word *Primus*, meaning first. The blossoming of the plants in the early spring led Linnæus to give them this name. It is said that their name was also applied, during the middle ages, to the European daisy (*Bellis perennis*).

This genus, *Primula*, is the type of the family and contains about one hundred and fifty species from which have been produced, both in nature and under cultivation, many hybrid forms, one investigator claiming to have found more than twenty in the Alps alone. The species are found distributed throughout the cooler regions of Europe and Asia and a few are natives of North America.

The common or English primrose (*Primula vulgaris*), by careful culture, produces a wonderful number of variations. The wild forms produce only yellow single flowers while from those under cultivation are developed numerous varieties, both single and double, which vary greatly in color—red, pink, white, purple, and many shades of each.

The cowslip primrose (*Primula veris*) is also a native of England. The flowers are yellow and nodding, and the plants emit a strong odor of anise.

The Himalaya Mountains are probably more rich in beautiful and interesting species and varieties than any other locality. Here is found the most beautiful of all the primroses, the delicate rose-colored form (*Primula rosea.*)

This species of primrose should not be confounded with the evening primrose, of which there are about twenty species, all American. The yellow flowers of the latter appear in the summer, opening at night, the thin and delicate petals withering the next day.

Public Library
LAWRENCE, MASS.

PRIMROSE.
6/7 Life-size.

CHICAGO:
UMFORD PUBLISHER.

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THE EGRET'S YOUNG.

ELIZA WOODWORTH.

Beside a quiet stream the egrets build,
And, friendly, crowd their nests of wattled sticks
In clustered trees, then patient keep unchilled
Their sea-blue eggs, and hear the first faint pricks

Against the shells; and soon each wistful brood
Beneath the mother's breast will doze or wake;
And soon each parent pair will wing with food
From waded shallows brown, and marsh and brake.

Between the flights they rest and tranquil look
Far down the glade from boughs or dusky nests,
And see the deer that wend beside the brook,
And partridge coveys, with their freckled breasts.

Oh, lives like sunny hours! Oh, peaceful glade,
Where glow the early flowers! What hunters steal
Along the stream, with rifles softly laid
At hand, while slips the skiff on noiseless keel?

The shots half-blind the air with curling haze,
And from his lookout perch the watcher falls;
The nested mother lifts her head to gaze,
And wounded, flutters down with hollow calls.

And, bleeding prone, perchance she mourns her young,
And hears, as far away, their startled cries,
And longs for pleasant haunts she lived among,
While in an anguished dream she slowly dies.

From off the gentle head they cut the crest,
They loose the wedding* plumes which veil the wings
And rend the beauty-tuft from out the breast—
Then each a mangled body downward flings.

The dimmed white forms strew all the blossomed ground,
While clustered trees but bear the wailing young;
Their plaintive little voices shrilling, sound
From swiftly chilling nests, once gayly swung.

Unfathered broods! In vain with hunger-calls
They grieve through woeful hours the helpless air;
Unmothered nests! How cold the darkness falls
On harmless, tender heads, uncovered there.

They live the painful night and feebly stir
At dawn; with famine shine the golden eyes;
They gape their mouths and seem to hear the whir
Of mother-wings speed past through empty skies.

And no more piteous sight the sun may see
Than where those parent birds lie dead; nor wakes
A sadder tone than the forsaken plea
Of famished broods that o'er their silence breaks.

Fainter and fainter sink the whispered cries,
As wanes the life and creeps the deadly chill,
Till wings are numb, and closed the hungry eyes,
While droop the downy heads, *and all is still.*

*The wedding plumes, which are esteemed the most valuable of all, are worn by the birds only during brooding time. Hence the special reason for hunting egrets at that season.

SPONGES.

A SPONGE when brought to the surface by the diver is a fleshy-looking substance covered with a firm skin whose openings appear and disappear at intervals. When the diver cuts it the interior looks like raw meat with numerous canals and cavities. The first thing they do is to remove the flesh, and this must be done at once, since otherwise putrefaction would set in, which would destroy the elasticity. This leaves merely the skeleton of the animal which has to be further cleansed before it is ready for the market.

The skeleton is nearly related in structure to silk, and this helped to settle the ancient dispute as to whether sponges were animal or vegetable. Their stationary life gave reason to the belief in their vegetable nature, while they multiply, like plants, by overgrowth and budding. They puzzled scientists for centuries, and one authority regarded them as worms' nests. In reality the sponge is a colony of little animals called polyps which occupy a sort of apartment house together, rearing families just as other animals do.

The surface of a sponge is covered with little holes, as you have observed, that are larger at the top than at the bottom, while the whole mass contains a system of channels. When the animal is alive water is kept flowing constantly through these channels by means of minute, hair-like appendages, which the little polyps agitate. The water thus drawn in brings with it the food.

The finest sponges come from Tripoli, and along the shores of the Mediterranean, the possessions of Turkey being the best field, the Spanish, French, and Italian coasts being, strange to say, devoid of them. The coarser kinds of sponges are found in the West Indies and off the Florida coast, none of the finest grade existing in American waters. The average value of Florida sponges is 80 cents a pound, while those from the Turkey coast are often worth as much as $50 a pound. There are many sponge beds along the coast of Florida, at well-protected places fenced in with natural fortifications and dams. They are carefully watched until reaching maturity, and are finer than those living wild in the sea.

After three years the sponges are ready for harvest. The choicest then, the full-grown ones, are pulled up, the others being left to reproduce until of larger size. Every year the value of a sponge farm increases, and enormous crops are yielded. It is easy to gather sponges here, for the water is clear and they are easily raised with a pole or tongs.

It is not so in Tripoli, however. There the work has to be done by divers, and as the fisheries have been so well worked, it is necessary for the divers to go deeper and deeper for them every year. Only the most desperate men are willing to undertake the task, notwithstanding they are paid ten times the usual wage paid to men in that country. Out of 600 divers employed, 150 to 200 die each season, either from asphyxiation, paralysis, or cuts from the knives. The diver in Tripoli seldom has diving-bells or suits such as are used in Europe and America. He goes down into the ocean, sometimes to the depth of 100 fathoms, taking with him a flat piece of stone of a triangular shape, with a hole drilled through one of its corners. A cord from the boat is attached to this stone and he uses it to guide him. Upon reaching the growing sponges he tears them off the rocks or cuts them with a sharp knife, places them under his arms, and then pulls at the rope, which gives the signal to the men in the boat to haul him up. The work is said to be done not so well by means of a diving-bell, the utmost care being necessary that the delicate organisms should not be torn. Sponges obtained by dragging are torn and sell for low prices. Those secured at such risk are the best and are used by surgeons in delicate operations. They do not grow as rapidly in the Mediterranean as in our water, an ordinary bath sponge, measuring about a foot in diameter, being ten years old.

—*E. K. M.*

COMMON MINERALS AND VALUABLE ORES.

IV.—COPPER AND LEAD ORES.

THEO. F. BROOKINS, B. S.

THE first metal that was employed by man is copper. It is probable that prehistoric man made use of the metal in its native condition only, as no knowledge of metallurgy would be essential in preparing it for use from that condition. Copper implements have been found in the lake dwellings of Switzerland, and bronze, an alloy of copper and tin, is mentioned in the writings of Homeric times.

Cuprum, the origin of our English word copper, is derived from cyprium, which refers to the occurrence of the metal in especial abundance on the island of Cyprus, the main source of the metal during the epochs of early alchemy. In the Hebrew scriptures copper is termed Nehósheth (from nahásh, meaning to glisten), which is translated by *Xaλkos* in the Septuagint and by Aes in the Vulgate. Later *Aes cyprium* was the special designation, which was finally shortened to *cyprium*, as indicated above. Thus we see that our present term represents in no sense the characteristic of the metal at first so noticeable.

Native copper scarcely needs a description. Its occurrence in the free state provides an interesting subject of conjecture. Briefly stated, the question of origin is whether the copper was set free by the decomposition of silicates or was in the form of a sulphide in the rock. The chief region of occurrence of native copper is the Lake Superior district. Here are found occasionally large masses of copper, which, strange as it seems, are practically valueless if too heavy to transport, since they cannot be divided without great difficulty. Of the world's total output of copper in 1897, 399,250 long *tons, a single mine of the Lake Superior region, the famous Calumet and Hecla, produced 40,350 long tons.

Montana is now the first copper producing state in the United States. The state contains the largest mining camp in the world, located in the town of Butte. In 1897 the mines of Montana produced 102,800 long tons of copper. The ore chalcocite, sometimes called copper glance, has a metallic luster, often tarnished green or blue. It is commonly lead-gray and rather soft. Its streak is a blackish lead-gray. Chalcopyrite, a sulphide of copper and iron combined, has already been mentioned under "Iron Minerals" (November issue of BIRDS AND ALL NATURE.) When copper is much in predominance the color of the ore is golden yellow. The streak is dark green. The mineral is harder than chalcocite, but less hard than pyrite, being easily scratched with a knife. Both chalcocite and chalcopyrite frequently occur in silver-bearing rocks.

A method of extracting copper from its ores, equally useful with regard to any of the ores, is known as the English process. The details of this are too elaborate and technical for consideration here. In brief, the process consists of six distinct parts—roasting the mixed ores, fusion of the roasted ores to produce coarse metal, roasting the coarse metal, fusion of the wasted coarse metal to produce what is known as white metal, roasting of the white metal to produce blister copper, i. e., copper filled with cavities, and finally the refining and toughening of the blister copper until marketable copper is yielded. The English method of copper smelting is classed among the so-called "dry" processes, in contradistinction from "wet" processes, or methods involving the use of solutions.

It may be of interest to know the importance of copper in that curious problem of ancient alchemy, the trans-

*The common short ton is 2,000 pounds; the long ton contains 2,240 pounds; the metric ton equals 2,204 pounds. It will be noted that statistics of the production of different metals frequently employ different tons as units.

mutation of metals. Metallic iron placed in certain solutions of unknown composition possessed the power to precipitate metallic copper. With all the wondrous faith in the problems of alchemy the phenomenon was interpreted as one of transmutation and the statement made that iron had been transformed into copper.

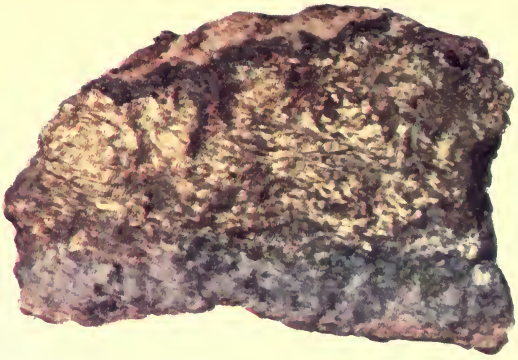
Within the last few years a remarkable increase in the output of the copper mines of the world has been recorded. This is due mainly to the demand for copper on account of the great strides in electrical achievements during recent years. Yet there is no doubt that the world's supply is wholly adequate to meet demands on it for a long period to come. The high conductivity of copper renders it especially useful for conveying electric currents and its most important use at present is in electricity. However, it is also a common convenience in many arts. Its alloys are numerous, bronze and brass being the most common. Bronze is an alloy of copper and tin and brass of copper and zinc. The manufacturer of bronze bells finds opportunity for an interesting study of the alloy used in his product. The varying tones of bells are due to the different percentages of copper and tin used in the bell metal.

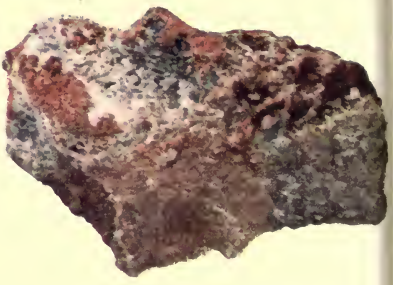
In locality and mode of occurrence lead is somewhat closely allied with copper, and the ores of lead and zinc are almost invariably associated. Hence a description of lead naturally follows that of copper and may also be understood as typical, so far as occurrence and mining methods are concerned, for that of zinc.

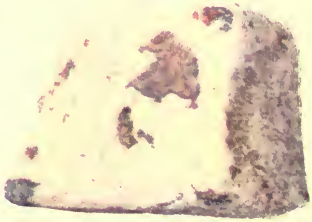
Lead occurs in nature chiefly in the forms of the sulphide, galenite or galena, the sulphate, anglesite and the carbonate, cerussite. Galena is lead-gray, quite soft, and frequently occurs in a coarsely crystalline condition, the crystals often being cubical. The luster is metallic, hence a superficial examination of a specimen might result in mistaking the mineral for the copper ore, chalcopyrite, already described. The streak will serve to identify any specimen, however, it being a lead-gray of much lighter shade than that of chalcocite. Anglesite and cerussite are far less abundant than galena. The former varies from white through gray to yellow and has a resinous luster. Cerussite is white or gray, resembling anglesite, and has a brilliant, vitreous luster. Both minerals, like galena, are soft and easily scratched with a knife.

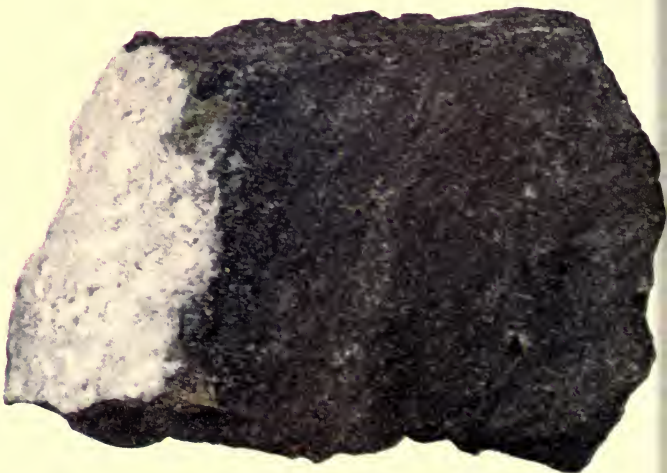
The ores of lead are widely distributed throughout the United States and it is difficult to assign boundaries to special districts. Galena occurs in small quantities—too small for profitable working—throughout the Appalachian region, and is found in paying quantities in what is known as the Missouri lead district. In the Colorado and other western mines the ore is found in silver-bearing veins. Were it not for the presence of silver in those veins the production of lead from them would probably practically cease, as the anglesite, the principal lead ore of the veins, does not occur in amount to pay for working the mines for that product alone.

White lead, used in paints, is the most important use of the metal. Painters prefer the product to zinc-white chiefly because it is much more opaque and possesses a much greater covering power. Much lead is made into pipes for conveying water. Pure lead is not used for the making of shot, but instead an alloy of lead and arsenic. Unlike pure lead, the alloy assumes a spherical form when dropped through the air. "Shot towers" are constructed to make use of this property in the manufacture of shot. The demands for lead have not been increased by recent extraordinary development of any of the arts employing the metal, hence the world's output of lead during the past decade has had a normal increase. For the year 1897 the total production of lead was 725,200 metric tons.









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BEES.—Honey is made from many substances. Not only do the flowers give up their nectar to the honey bees, but various other sources of sweets are visited by bees with profit. Clover honey is one of the most common kind, although it is all white clover honey, for the honey bee has too short a tongue to reach into the long tubes of the red clover which the bumble-bees are so fond of. Sweet clover yields nectar which makes good honey. A dark variety of honey comes from the flowers of buckwheat, and the basswood tree which the German poets sing about, calling it by the name of linden, bears such a wealth of flowers which the honey bees like that it is swarmed day after day by so many bees that the tree seems to hum with pleasure. You can often hear the bees in a basswood tree before the tree itself is in view in the forest. Orange trees are also favorites with the honey-makers.

Broken fruits are often sucked by bees to get material for honey, and cider left in a dish where they can get at it will be visited by them. A mixture of almost any sweet liquid will attract honey bees, and they are so careless of its exact nature that they have been known to store up and make into honey substances that are not good for human beings to eat. One of the favorite forms of adulteration among those who keep bees for profit is to place glucose and water where they can get at it. They will readily fill their combs with this cheap material and seem to do very much more work in the course of a season by having placed within easy reach a mass of material that they do not have to work for.

Margaret Warner Morley, in her charming little book, "The Bee People," which has just come from the press of A. C. McClurg & Co., Chicago, tells how bees frequently make honey from "honey dew." This is a sweet and sticky substance that is found upon the upper side of all sorts of leaves in some localities and has caused a great deal of wonder as to where it comes from. The writer tells of the mountain children she saw in the Carolinas plucking these leaves and licking the honey-dew from them, enjoying their treat much as city children enjoy what they get at the candy store. She says the honey-dew is made by the little insects called ants' cows or aphides. The sweet liquid is thrown out from their bodies, and ants are so fond of it that some of them have been said to keep "cows" and take great care of them in order to enjoy the sweet they get from their bodies.

The aphides eat the juice of the leaves they rest on and change it into honey-dew. Resting on the under side of a leaf and feasting royally, they become so full that the honey-dew spurts from their bodies and showers the upper sides of the leaves below. Sometimes the insects are so thick upon the leaves of a magnolia tree that a shower of sweets comes down upon its lower leaves and the grass below. Trees and bushes shine with the dew, and when dust settles upon the sticky surfaces it is decidedly disagreeable.

Pliny, the first great naturalist, said he thought honey-dew was "the perspiration of the sky, the saliva of the stars, or the moisture deposited by the atmosphere while purging itself, corrupted by its admixture with the mists of the earth." Bees gather it and make it up into honey. Squirrels are fond of it, and gather the leaves one at a time, hold them up in their paws, and lick them with apparent relish.

There are so many truly wonderful things about bees which this talented writer has collected and told in simple language that her book is one of the most valuable of recent contributions to the libraries of those who enjoy the wonders of nature. Although written evidently for children it is of absorbing interest to adults, and furnishes a fund of material for conversation and observation which will make it very much in demand among teachers and parents.

The growth of the bee, the drones, the workers, and the queens, with all the details of their structure as revealed by the microscope, the making of their

curious homes, their odd customs and habits, their strange enemies, and a thousand other interesting features, make the subject one of great interest, and we cannot sufficiently honor the memory of the blind naturalist, Huber, who found out more things about bees after he lost his sight than all the world ever knew of them before his time.

BAD GERMS.—In our bodies is constantly going on a great fight between germs of various sorts, if we are to believe those who know most on the subject. Microbes are all about within us, some of them apparently striving to do us good and others trying kill us. In a few cases men of science have been able to find one kind of germ that will destroy another that is hurtful to the human system. By cultivating many sorts of germs together and separately they have come to know a great deal about what microbes like and what they cannot bear. The so-called poisons of diphtheria and typhoid fever have been recognized as having certain forms and characteristics, and a way of killing them off at wholesale has been found, and so we are not so much afraid of these diseases as we were before these discoveries were made. The germs of cholera and yellow fever are now well enough known to be controlled by sanitary measures, and the doctors are hot on the track of the bacillus of consumption. What relief the world will have when these germs are killed before they have had time to do their deadly work!

A DESERT LIGHT.—In Arizona there is an important well which stands in the desert where its presence would not readily be known, but for the fact that a light now swings from a tall cotton-wood pole so as to light travelers who are within several miles of it in the night. Before the lantern used to be hung there many people died when they might have reached its waters if they had only known how near and in which direction the well really was. Some have died horrible deaths of thirst when only a short distance from its refreshing waters. In order to pass that point travelers have to carry large loads of water to quench their thirst until they reach this well. The number of gallons a company has means either life or death to all. Some time ago a German boy staggered up to the tanks shortly after dark. He had lain down expecting to die with thirst in despair of getting to water, when he saw the light of the cabin of the keeper of the well. So Joe Drew keeps his lantern up at night that others may see the signal from afar and come without delay to the waters.

MINER'S LUCK.—One of the most profitable mines in South America is the Penny mine in Bolivia. Penny was a run-away Scotchman from a man-o'-war who had nothing and hoped for nothing but to keep away from service on the sea. He did odd jobs about the country for awhile and was brought low with fever. He was faithfully nursed through the disease by a native woman who could not speak a word of English. Out of gratitude he married her and treated her well. She rewarded him by taking him into the mountains and showing him an old Spanish mine that had been hidden for years. He began working it and became a millionaire. With a fellow-workman by the name of Mackenzie he brought the mine into a good state of productiveness, and then left for the old country. Mackenzie was made superintendent of his mine, and Mackenzie's son went with Mr. and Mrs. Penny to Scotland. He arrayed his Indian wife in the most costly attire, and made his visit to Scotland memorable by his many acts of generosity. He adopted a nephew and insisted that both young men should take his name and become his heirs. He suddenly died and left his wealth all to his wife, with directions that the two sons should be amply provided for. Complications followed, and the Indian mother died under suspicious circumstances, while the boys contended for possession of the mines. With all the good fortune and excellent intentions of the father the two boys proved to be bad Pennies. They sold out their interests for $500,000 each and are now killing themselves with drink.

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

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APRIL.

These rugged, wintry days I scarce could bear,
Did I not know, that, in the early spring,
When wild March winds upon their errands sing,
Thou wouldst return, bursting on this still air
Like those same winds, when, startled from their lair,
They hunt up violets, and free swift brooks
From icy cares, even as thy clear looks
Bid my heart bloom, and sing, and break all care:
When drops with welcome rain the April day,
My flowers shall find their April in thine eyes,
Save there the rain in dreamy clouds doth stay,
As loath to fall out of those happy skies;
Yet sure, my love, thou art most like to May,
That comes with steady sun when April dies.

—*Lowell.*

THE PROCESSION OF SPRING.

A morning of radiant lids
O'er the dance of the earth opened wide;
The bees chose their flowers, the snub kids
Upon hind legs went sportive, or plied,
Nosing, hard at the dugs to be filled;
There was milk, honey, music to make;
Up their branches the little birds billed;
Chirrup, drone, bleat, and buzz ringed the lake.
O shining in sunlight, chief
After water and water's caress,
Was the young bronze orange leaf,
That clung to the trees as a tress,
Shooting lucid tendrils to wed
With the vine hook tree or pole,
Like Arachne launched out on her thread.
Then the maiden her dusky stole,
In the span of the black-starred zone,
Gathered up for her footing fleet.
As one that had toil of her own
She followed the lines of wheat
Tripping straight through the field, green blades,
To the groves of olive gray,
Downy gray, golden-tinged; and to glades
Where the pear blossom thickens the spray
In a night, like the snow-packed storm;
Pear, apple, almond, plum;
Not wintry now; pushing warm.
And she touched them with finger and thumb,
As the vine hook closes; she smiled,
Recounting again and again,
Corn, wine, fruit, oil! like a child,
With the meaning known to men.

—*George Meredith.*

THE AMERICAN BITTERN

(*Botaurus lentiginosus.*)

THIS curious bird has several local names. It is called the "stake-driver," "booming bittern," and "thunder-pumper," in consequence of its peculiar cry. It was once thought that this noise was made by using a hollow reed, but the peculiar tone is possibly due to the odd shaped neck of the bird. Gibson says you hear of the stake-driver but can not find his "stake."

We have never seen a bittern except along water courses. He is a solitary bird. When alarmed by the approach of someone the bird sometimes escapes recognition by standing on its short tail motionless with its bill pointing skyward, in which position, aided by its dull coloring, it personates a small snag or stump or some other growth about it.

This bird has long legs, yellow green in color, which trail awkwardly behind it and serve as a sort of rudder when it flies. It has a long, crooked neck, and lengthy yellow bill edged with black. The body is variable as to size, but sometimes is said to measure thirty-four inches. The tail is short and rounded. In color this peculiar bird is yellowish brown mottled with various shades of brown above, and below buff, white and brown.

It is not a skillful architect, but places its rude nest on the ground, in which may be found three to five grayish brown eggs.

The habitat of the American bittern covers the whole of temperate and tropical North America, north to latitude about 60 degrees, south to Guatemala, Cuba, Jamaica and the Bermudas. It is occasionally found in Europe.

Frank Forrester included the bittern among the list of his game birds, and it is asked what higher authority we can have than his. The flesh is regarded as excellent food.

OUR LITTLE MARTYRS.

GEORGE KLINGLE.

Do we care, you and I,
For the song-birds winging by,
Ruffled throat and bosom's sheen,
Thrill of wing of gold or green,
Sapphire, crimson—gorgeous dye
Lost or found across the sky,
Midst the glory of the air;
Birds who tenderer colors wear?

What to us the free-bird's song,
Breath of passion, breath of wrong;
Wood-heart's orchestra, her life;
Breath of love and breath of strife;
Joy's fantasies; anguish breath;
Cries of doubt, and cries of death?

Shall we care when nesting-time
Brings no birds from any clime;
Not a voice or ruby wing,
Not a single nest to swing
Midst the reeds, or, higher up,
Like a dainty fairy-cup;
Not a single little friend,
All the way, as footsteps wend
Here and there through every clime,
Not a bird at any time?

Does it matter? Do we care
What the feathers women wear
Cost the world? Must all birds die?
May they never, never fly
Safely through their native air?
Slaughter meets them everywhere.

Scorned be the hands that touch such spoil!
Let women pity and recoil
From traffic barbarous and grave,
And quickly strive the birds to save.

FROM COL. F. NUSSBAUMER & SON.
W. MUMFORD, PUBLISHER, CHICAGO.

AMERICAN BITTERN.
⅓ Life-size.

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LITTLE GUESTS IN FEATHERS.

NELLY HART WOODWORTH.

A BROOKLYN naturalist who gives much time to bird-study told me that as his rooms became overfull of birds he decided to thin them out before the approach of winter. Accordingly he selected two song sparrows and turned one of them adrift, thinking to let the other go the next morning.

The little captive was very happy for a few hours, flying about the "wild garden" in the rear of the house—a few square rods where more than 400 varieties of native plants were growing. It was not long, however, before a homesick longing replaced the new happiness and the bird returned to the cage which was left upon the piazza roof.

The next morning the second sparrow was given his freedom. Nothing was seen of him for a week, when he came to the window, beat his tired wings against the pane, and sank down upon the window sill so overjoyed at finding himself at home that he was fairly bursting with song. His throat trembled with the ecstasy; the feathers ruffling as the melody rose from his heart and deluged the air with sweetness. His joy was too complete for further experiment.

The first sparrow was again released only to return at nightfall and go promptly to bed at the general retiring hour.

This hour, by the way, varied indefinitely; the whole aviary accommodating their hours to those of their master, rising with him and settling for the night as he turned off the gas. After this same bird was repeatedly sent out, like Noah's dove, coming home at evening, till after many days it came no more—an implicit confidence in the rightness of all intention doubtless making it an easy prey to some evil design.

A handsome hermit thrush from the same aviary, domesticated in my room, after an hour or two "abroad" is as homesick for his cage as is a child for its mother.

When this bird came into my possession his open and discourteous disapproval of women was humiliating. His attitude was not simply endurance but open revolt, a deep-rooted hatred for the entire sex. When, after long weeks of acquaintance, this hostility was overcome he followed me about the room, stood beside me at my work, and has since been unchanging in a pathetic devotion.

He plants his tiny feet in my pen-tray and throws the pens upon the floor. He stands on tiptoe before the mirror, staring with curious eyes at the strange rival till awe is replaced by anger and the brown wings beat in unavailing effort to reach the insolent mimic. When shown a worm he trembles in excited anticipation, his little feet dancing upon the floor, his wings moving rapidly, while he utters a coaxing, entreating syllable. The song is sweetest when raindrops fall or when the room is noisy and confused. I notice, too, that he is more tuneful before a rain.

I must confess that he keeps late hours, that he is often busy getting breakfast when orthodox birds should be dreaming, his active periods being liable to fall at any hour of the night, more especially if there be a moon. An intensely sentimental nature may be unable to sleep when the beauty of the world is so strongly emphasized.

His last frolic was with a frog the children smuggled into the house, chasing it around the room, darting at it with wide-open beak, advancing and retreating in a frenzied merriment.

As the cage door is often left open he is sometimes "lost" briefly. At one of these times I decided that he had gone to sleep under the bed and would be quite safe till morning. Before daylight my mother called to me from the next room that there was "something in her bed," and, sure enough, the truant

stood upon her pillow, his wings almost brushing her face.

The song of an indigo bird, kept in my room, is often followed by from two to four subdued notes of exceeding richness and sweetness. Aside from the ordinary song, sometimes reduced to the syllables, "meet, meet, I'll meet you," words unheard save by aid of a vivid imagination, the bird has an exquisite warble, loud and exhilarating, as rounded and velvety as the bluebird's.

When the bird became familiar with the room, its occupants and the sunshine streaming in through the window, his happiness crystallized in song, a rarely beautiful strain unheard before. The feathers on his throat would ruffle as a wave of song ran upward filling the room with a delicious music.

Unlike the hermit thrush, which has silent, preoccupied hours and is given to meditation, the indigo has no indolent days and is a happy, sunny-hearted creature.

His attitudes are like the catbird's—erecting crest, flirting body and tail, or drooping the latter in the precise manner of the catbird. Judged by indigo dress-standards, this bird is in an undress uniform, quite as undress as it is uniform; as somebody says, a result of the late moult.

For all this his changeable suit is not only becoming, but decidedly modern—warp of blue and woof of green that change with changing light from indigo to intense emerald. Then there are browns and drabs in striking contrasts—colors worn by indigoes while young and inexperienced, the confused shades of the upper breast replaced by sparrowy stripes beneath.

My bird is a night singer, pouring out his tuneful plaint as freely in the "wee, sma' hours," as when the sun is shining; its notes as sweet as if he knew that if we *must* sing a night song it should be sweet that some heart may hear and be the better for our singing. Later in the day a purple finch in the cedar tangle challenged the vocalist in notes so entrancing that one's breath was hushed involuntarily.

The same finch sang freely during the entire season in notes replete with personality, a distinct translation of the heart language. Others might sing and sing, but this superb voice rose easily above them all, a warbling, gurgling, effervescing strain, finished and polished in notes of infinite tenderness. Short conversations preceded and followed the musical ecstasy, a love song intended for one ear only, while wings twinkled and fluttered in rhythm with the pulsing heart of the melodist. No doubt he was telling of a future castle in the air beside which castles in Spain are of little value.

PLANTING THE TREES.

What do we plant when we plant the trees?
We plant the ships which will cross the seas.
We plant the mast to carry the sails,
We plant the planks to withstand the gales—
The keel, the keelson, and beams and knee;
We plant the ship when we plant the tree.

What do we plant when we plant the tree?
We plant the homes for you and me.
We plant the rafters, the shingles, the floors,
We plant the studding, the laths, the doors,
The beams, the sidings, all parts that be;
We plant the home when we plant the tree.

What do we plant when we plant the tree?
A thousand things that we daily see.
We plant the spires that outtower the crag,
We plant the staff for our country's flag,
We plant the shade, from the hot sun free;
We plant all these when we plant the tree.

ORIGIN OF THE EASTER EGG.

ELANORA KINSLEY MARBLE.

NOW is the time of year when we feel called upon to inform our readers that the peacock does not lay the pretty colored Easter eggs.

This valuable bit of information the great American humorist feels called upon to make year after year, and though we elder folk smile, and the young query, how many of us are familiar with the history of the custom of observing the closing of Lent with the egg feast?

One must go back to the Persians for the first observance of the egg day. According to one of the ancient cosmogonies, all things were produced from an egg, hence called the mundane egg. This cosmogony was received in Persia, and on this account there obtained, among the people of that country, a custom of presenting each other with an egg, the symbol of a new beginning of time on every New Year's day; that is, on the day when the sun enters Aries, the Persians reckoning the beginning of the new year from that day, which occurred in March. The doctrine of the mundane egg was not confined to the limits of Persia, but was spread, together with the practice of presenting New Year's eggs, through various other countries. But the New Year was not kept on the day when the sun enters Aries, or at least it ceased, in process of time, to be so kept. In Persia itself the introduction of the Mohammedan fa th brought with it the removal of New Year's day.

Among the Jews the season of the ancient New Year became that of the Passover, and among the Christians the season of the Passover has become that of Easter. Among all these changes the custom of giving an egg at the sun's entrance into Aries still prevails. The egg has also continued to be held as a symbol, and the sole alteration is the prototype. At first it was said to be the beginning of time and now it is called the symbol of the resurrection. One sees, therefore, what was the real origin of the Easter egg of the Greek and Roman churches.

From a book entitled "An Extract from the Ritual of Pope Paul V.," made for Great Britain, it appears that the paschal egg is held by the Roman church to be an emblem of the resurrection, and that it is made holy by a special blessing of a priest.

In Russia Easter day is set apart for paying visits. The men go to each other's house in the morning and introduce themselves by saying "Christ is arisen." The answer is "Yes, he is risen!" Then they embrace, exchange eggs, and sad to relate, drink a great deal of brandy.

An account of far older date says, "Every year against Easter day, the Russians color or dye red with Brazil wood a great number of eggs, of which every man and woman giveth one unto the priest of the parish upon Easter day in the morning. And, moreover, the common people carry in their hands one of these red eggs, not only upon Easter day but also three or four days after. And gentlewomen and gentlemen have eggs gilded, which they carry in like manner. They use the eggs, as they say, for a great love and in token of the resurrection whereof they rejoice. For when two friends meet during the Easter holidays, they come and take one another by the hand; the one of them saith, 'The Lord, our Christ, is risen!' The other answereth, 'It is so of a truth!' Then they kiss and exchange their eggs, both men and women continuing in kissing four days together."

There is an old English proverb on the subject of Easter eggs, namely: "I'll warrant you an egg for Easter." In some parts of England, notably in the north, the eggs are colored by means of dyeing drugs, in which the eggs are boiled. These eggs are called "paste" eggs, also "pace" and "pasche," all derived from "pascha"—Easter.

MORAL VALUE OF FORESTS.

A COMPARATIVELY untouched phase of the question of forest destruction is brought out in a book called "North American Forests and Forestry," by Ernest Bruncken, a prominent western forester. The author incidentally discusses the part which our forests have had in shaping American character and our national history. This phase of the matter is interesting both as a historical study and as a suggestion of the moral as well as economic loss which must come with the denudation of our forest areas.

All thinking Americans know that the forests are an important factor in our commercial life, and Mr. Bruncken makes an impressive statement of the way in which the lumber industry permeates all the nation's activities. But the part played by the vast primeval forests in creating American character is not so generally realized. From the earliest colonial times the forests have had a moral and political effect in shaping our history. In the seventeenth century England was dependent upon Norway and the Baltic provinces for its timber for ships. This was in various ways disadvantageous for England, so the American colonists were encouraged with bounties to cut ship timbers, masts and other lumber for European export. This trade, however, was found to be unprofitable on account of the long ocean voyage, so the American lumbermen began to develop a profitable market in the West Indies. This was straightway interdicted by the short-sighted British government, and the bitter and violent opposition of the colonists against this tyrannical policy ceased only with the end of British dominion.

From that time to the present the forests of America have exercised a most important influence upon the nation, especially in creating the self-reliance which is the chief trait of the American character. The trappers, hunters, explorers and backwoods settlers who went forth alone into the dense forests received a schooling such as nothing else could give. As the forest closed behind the settler he knew his future and that of his family must henceforth depend upon himself, his ax, his rifle, and the few simple utensils he had brought with him. It was a school that did not teach the graces, but it made men past masters in courage, pertinacity, and resourcefulness. It bred a new, simple, and forceful type of man. Out of the midst of that backwoods life came Abraham Lincoln, the greatest example of American statesmanship the nation has produced. In him was embodied all the inherent greatness of his early wilderness surroundings, with scarcely a trace of its coarser characteristics.

As Mr. Bruncken says, mere remembrance of what the forests have given us in the past should be enough to inspire a wish to preserve them as long as possible, to stop wanton waste by forest fires, and even to repair our losses by planting new forests, as they do in Europe. The time has gone when the silence and dangers of the forest were our chief molders of sturdy character, but it is undeniable that the pioneer blood that still runs so richly in American veins has much to do with causing the idea of Philippine expansion to appeal so powerfully to the popular imagination. The prophets who see in the expansion idea the downfall of the nation forget that the same spirit subdued the American wilderness and created the freest government and some of the finest specimens of manhood the world has ever seen.

EASTER LILIES.

Though long in wintry sleep ye lay,
The powers of darkness could not stay
Your coming at the call of day,
Proclaiming spring.

Nay, like the faithful virgins wise,
With lamps replenished ye arise
Ere dawn the death-anointed eyes
Of Christ, the king.

—*John B. Tabb.*

FROM COL. F. KAEMPFER.
. MUMFORD, PUBLISHER, CHICAGO

SCARLET IBIS.

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THE SCARLET IBIS.

(*Guara rubra.*)

IBISES are distributed throughout the warmer parts of the globe and number, according to the best authorities, about thirty species, of which four occur in North America. The scarlet ibis is a South American species, though it has been recorded from Florida, Louisiana, and New Mexico. The ibises are silent birds, and live in flocks during the entire year. They feed along the shores of lakes, bays, and salt-water lagoons, and on mud flats, over which the tide rises and falls. Their food consists of crustaceans, frogs, and small fish.

Colonies of ibises build nests in reedy marshes, or in low trees and bushes not far from good feeding-grounds. Three to five pale greenish eggs, marked with chocolate, are found in the coarse, bulky nest of reeds and weed stalks.

These birds are not so numerous as they once were. They have been wantonly destroyed for their plumage alone, the flesh being unfit for food.

CHIPPY—A BABY MOCKING BIRD.

MARTHA CROMBIE WOOD.

ONE bright day early in August I sat by my window writing. My attention was soon attracted by a pair of mocking birds which were flying back and forth between a peach-tree and a plum-tree near by.

These birds having been near neighbors of mine for some time, I had named them Jack and Jill.

A family quarrel seemed brewing, for Jack evidently found more good points in the plum-tree and scolded Jill for spending any time in the peach-tree, while Jill was equally impressed with the favorable aspect of the peach-tree. I thought they were trying to decide upon a location for a nest and was soon convinced that I was right, for Jack ended the family disagreement by taking a twig in his bill and carrying it to the plum-tree, where he began balancing it among some of the small branches. His mate continued to scold from her place in the peach-tree, but when he paid no attention to her and went on with his work she soon relented and flew down to offer her assistance.

With very little difficulty these birds could carry a twig six or eight inches long and a quarter of an inch in diameter. Several of these large twigs were laid loosely among the forks of three small branches and then a more compact structure was placed upon this foundation. This was made of smaller twigs, with roots and stems of Bermuda grass twisted among them. A lining composed of horse hair, grass, cotton, a piece of satin ribbon some three inches long, bits of paper, string and rag completed the home.

There was very little weaving in the construction of the nest and the most wonderful as well as the most curious thing about it was how it could be made so loosely and not fall apart during the very high winds which we have in central Texas.

While the eggs were being hatched there was a violent storm which lasted all day, and several times I saw the tree bend nearly to the ground. Each time I was afraid I should see the destruction of this home, which had become so interesting to me. As I watched the tree writhe in the storm I began to appreciate the wisdom shown by the bird in the selection of the place for his nest, for it was in the part of the tree least disturbed by the wind and most thoroughly protected from the rain.

During the long nights the mocking bird often sang to his mate as she patiently sat on the nest.

Nothing can be more delightful than the song of our mocking birds, heard when the moonlight makes the night almost as light as the day and the south wind is ladened with the delicious odors of roses and honeysuckle.

At last the eggs were hatched and five baby birds demanded food. The parent birds worked constantly from dawn till dark, but, from the loud "*ce-ce-ce*" which greeted them each time they neared the nest, one might suppose the supply of food never equaled the demand.

A young mocking bird seems all mouth and legs. He is a comical little creature with his scant covering of gray down, long legs, large feet and ever-open mouth, with its lining of bright orange.

As the old bird approaches the little ones squat flat in the nest, throw back their heads and open their enormous mouths, which must seem like so many bottomless pits to the parent birds when they are tired.

If my favorite cat, Mephistopheles, tried to take his nap anywhere in the vicinity of their nest Jack and Jill would fly at him, screaming, and, boldly lighting upon his head, try to peck at his eyes. He would strike at them and spit, but they would only fly upon the fence or rose-trellis and in a moment dart at him again. The battle would continue until Mephistopheles retired to a safer place.

I have seen many such battles, but never one where the bird was not victorious.

One morning, when the birds were still quite small, one of them tumbled from the nest. At first I thought the mother-bird might have pushed it out that it might learn to fly, but after seeing the feathers of its wings had only reached the tiny pin-feather stage, I knew it was too young for such efforts and concluded that the nest was overcrowded. I tried to put it in the nest for it was drenched with the dew from the grass.

Jack and Jill objected so seriously to my assistance that I had to give up this plan, for they flew at me just as they did at Mephistopheles. Fearing the cat would hurt it I was compelled to take it into the house.

Then my troubles began. It seemed to take all of my time to feed this one bird, and I could not imagine how Jack and Jill could take care of it and four others.

For awhile it seemed very much frightened, but at length began to chirp. The old birds answered at once and soon came to the screen on the window and called to it. Knowing they would feed it if they could reach it I had to keep it away from them, for, should they discover it was a prisoner, they would give it poison.

We named it Chippy and it soon became a great pet. Whenever anyone entered the room where it was its mouth flew open, and from its shrill "*chee-chee-chee,*" one might easily imagine it was on the verge of starvation.

When I had had it a week it would try to fly from the floor to the lower rounds of a chair. When it had learned to fly, if left alone it would call until someone answered, and then follow the sound until it found them. I have known it to fly through two rooms, a downstairs hall, up the stair-steps, through the upper hall, and into my room in response to my whistle.

When it first made this journey it could fly only two or three feet at a time and had to fly from step to step up the stairway.

Soon after this I took Chippy out of doors. He was very much delighted when placed in a young hackberry tree, where he could fly from branch to branch. When he reached the top of the tree Jill flew into a tree near by and tried to coax him to come to her. I saw Chippy spread his wings and supposed I had lost my pet. Imagine my surprise when he gave a shrill scream and flew straight to me, lighting on my shoulder and nestling against my face.

Jill followed him, resting in a vine some three or four feet from me. When coaxing failed she flew away but soon returned with a grasshopper in her bill.

I drove Chippy away from me, hoping he would return to his own family, where his education could be carried on according to their ideas.

He flew into a tree, ate the grasshopper which Jill fed to him, and then flew on the roof of the porch outside my window, where he sat calling me. Go-

ing to my room I opened the screen to let him in, but this startled him and he flew away.

The sun had gone down by this time and I supposed he had at last returned to the nest. As I sat at the supper table I heard him calling to me and went outside.

He was in a tree in a neighbor's yard, but when he saw me he at once flew down on my head, and it was comical to see him try to express his joy.

After that he spent his days among the trees, but at sunset always came to the house and slept in a box in my room.

Whenever he was hungry he would come to the window and call for food.

His favorite resting-place was on my shoulder or head and he seemed to be very fond of company.

One morning I saw Jack and Jill flying from tree to tree with him and that is the last I ever saw of any of them.

BIRDLAND SECRETS.

SARA E. GRAVES.

Tell me what the bluebird sings
When from Southland up he springs
Into March's frosty skies
And to our New England flies,
Where, upon some sunny morn
Hear we first his note lovelorn.

Now he 'mong the maple flits,
Now upon a fencepost sits,
Lifting wings of heaven's own blue
As he warbles, clear and true,
Song so plaintive, soft and sweet,
All our hearts with welcome beat.

What the message full he brings
When in March's ear he sings?
Tell me what our robins think
When our April airs they drink,
Following close in Bluebird's train
With their blither, bolder strain.

Sit they high on maple tall
Chirping loud their earnest call,
Redbreasts glowing in the sun,
Then across the sward they run
Scampering briskly, then upright,
Flirt their tails and spring to flight.

Or, when drops the light of day
Down the westward golden way,
Robin mounts the tallest branch
Touched by sunset's quivering lance;
Carols forth his evening tune
Blithe as Earth were in her June.

Tell me what the sparrow says
In those first glad springtime days,
When the maples yield their sweet,
When Earth's waking pulses beat,
When the swollen streams and rills
Frolic down the pasture hills.

Winter birds and squirrels then
Grow more lively in the glen,
And, when warmer airs arise,
Sparrow sings her sweet surprise
From the lilac bushes near,
Song of faith and hope and cheer.

Tell me, when the longer train
Up from Southland sweeps again,
Filling fields and glens and woods—
Wildest, deepest solitudes—
With more brilliant life and song,
Golden lyre and silver tongue,
Bells that ring their morning chimes
Wood nymphs voicing soothing rhymes
Stirring all the sun-filled air
With hymns of praise and love and prayer.

Tell me whence their motive power,
Tell me whence so rich a dower,
Tell me why are *birds* so gifted;
Whence their imprisoned spirits drifted;
Whither swells this tide of love
Flooding all the air above?
Whither these enchantments tend?
A brief bird life—is this its end?

THE MASSENA QUAIL.

(*Cyrtonyx Massena.*)

THIS beautiful species is said to be by far the most gentle and unsuspicious of our quails, and will permit a very close approach by man, showing little or no fear of what most animals know so well to be their most deadly enemy. While feeding they keep close together, and constantly utter a soft clucking note, as though talking to one another.

This species is about the size of the eastern variety. Its head is ornamented with a beautifully full, soft occipital crest. The head of the male is singularly striped with black and white. The female is smaller and is quite different in color, but may be recognized by the generic characters. The tail is short and full, and the claws very large.

The quail makes a simple nest on the ground, under the edge of some old log, or in the thick grass on the prairie, lined with soft and well-dried grass and a few feathers. From fifteen to twenty-four white eggs are laid. The female sits three weeks. The young brood, as soon as they are fairly out of the shell, leave the nest and seem abundantly strong to follow the parent, though they are no bigger than the end of one's thumb—covered with down. The massena quail is an inhabitant of the western and southwestern states.

IN THE OLD LOG HOUSE.

BY BERTHA SEAVEY SAUNIER.

THE big orchard on the Triggs place was also the old orchard. Grandpa Triggs had planted it long ago in his young days when the country was new. The year before he had hauled logs from yonder forest with his ox-team and built the strong little house that still stands at the foot of the orchard.

He brought young crab trees, too, and set them all about the house and though, after the orchard was started, he often threatened to cut them down, he never did it and they grew into a tangle of friendship and protection until the little one-roomed house was nearly hidden.

The house was desolate now. The catbirds built their nests in the crotches of the crabs and the jays came over from the woods across the river and quarreled with them. An old zigzag rail fence separated the orchard from the hay-field at one end and a tall uncared-for osage hedge did scant duty at two sides. Once in a great while a sheep would leave the aftermath and step through the wide spaces of the hedge and, entering the doorless house, would walk curiously about and then return. But that was all—no, not quite all. The children built fires in the great fireplace and roasted potatoes or experimented at cooking carrots, artichokes, apples and occasionally a pair of kidneys rolled each in several thicknesses of brown paper and slowly cooked under the hot ashes and coals. To be sure, the smoke came out into the room and got into the children's eyes and passed out at the door—for the chimney had crumbled to half its old time height—but the playtimes went on in spite of that and the birds shouted and sang outside.

One would expect that all this activity above board to be happily interested without looking for new and startling circumstances under ground. But, withal, life went on among the "under-

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MASSINA PARTRIDGE.

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ground lights," with its busy unconcern of affairs which it could not share or even comprehend. Rarely when the fire warmed the bricks about the fireplace did comely, plump Mrs. Acre Tidae fail to raise her song. She had a way of building a home had Mrs. House Cricket. She tossed out a few grains of earth from under the brick tiling of the hearth and presto! she entered in backward and sat down waving her long slender antennae with a happy content that would shame many a one who, having more, is not satisfied. Mr. Field Cricket, who happens also to be named Acre Tidae, had built his home at the edge of the path in the sandy loam just without the door. Two bodies of the same name and family would be expected to live in the same house, but they couldn't quite come to do that on account of tastes. For one thing they differed in the matter of dress, though that was the least objection one to the other. Mrs. House Cricket wore a grayish yellow dress, marked a little with brown and Mr Field Cricket wore darker colors. He built his home deeper, too, which would never suit Mrs. Acre Tidae at all. Sometimes his home is twelve inches deep, and six it is sure to be. And then, big fellow that he is, quite a bit larger than she, he does not mind the cold. He snuggles down in the deep darkness as soon as he sees the dew frozen in the tiny crystals all over the long grass blades, and sleeps the time away, however long and cold the winter may be; and such a life is scorned by bright Mrs. House Cricket, who chooses the hearth on account of the warmth and who chirps joyfully throughout the year, except when the fire goes out, as it often does in the little old log house; for there were days and days when the children did not come to play. At such times Mrs. House Cricket was forced unwillingly to fall asleep. "Shameful!" she would mutter, as the last flicker of feeling departed. "Such a waste of time. If I had built in a bakery or by a brick oven how much busier I might be—and happier. I'm no better than those cousins of mine who make it a business to sleep half the year around." These last words were so soft as she scraped them off on the ridges of her wing covers that the children, who were just going home, stopped and Linsey said, "Do hear the cricket—it says, 'Good night; good night.'"

"By-by, Crick!" called Harry, as he leaped through the hedge and ran to the brook to stamp on the thin ice with his heel. "I shall move out," moaned Mrs. Cricket with her faintest note. But moving day did not arrive for many weeks and Mrs. Cricket awoke and went to sleep as many times; and finally the long hot days found her contentedly basking in the field among the warm grasses, having forgotten the troubles of the winter. "Dear me," she was softly drumming with her wing covers as she stopped in her evening search for food. "Dear, dear! how that big cousin of mine does scream! Perhaps he calls it music, but I don't."

She crept along slowly and hid in a fold of rain-worn paper near the home of her much criticized relative. He was sitting in his doorway singing his evening song as loud as he could, for he was singing with a purpose. The source of his music lay within his wing covers. Nearly one hundred and thirty fine ridges were on the under side of one wing cover (which is hard and horny), and these are hastily scraped over a smooth nervure which projects from the under side of the other wing cover. And that is how he sings. His song is bound to be a love-song and Mrs. House Cricket finding a few crumbs within the paper and deciding to stay all night suddenly heard the loud, harsh tones softened and, looking out, she saw her big cousin standing close to another dark form like his own. He was crooning softly as he caressed her with his slender, delicate antennæ—his mate, whom he had won to himself with his song. Mrs. House Cricket looked on for a moment and changed her mind about staying all night. "I'll creep under a leaf," she said, "and leave the lovers to themselves." So she slipped away and saw them no more until, some weeks later, she passed and, seeing her cousin in his door, stopped:

"I have all my eggs laid," she said,

"and I'm going up toward the big house to stay until the weather gets cold."

"Mrs. Field Cricket has two hundred eggs right here under this long grass," he answered with great pride. "She is welcome," returned his cousin; "for my part I prefer quality to quantity." And she turned away to take a peep at the nursery which was warmed and nourished only by the sun.

"They will soon hatch out and dig homes each for himself like my own little ones," she said as she left them and began her long journey toward the farmhouse. "But mine will be wise enough to get near to a barn or house when they are grown up," she mused, "so that they need not sleep all winter, and they can be busy and useful to the world—busy, useful, cheerful, hopeful." She stopped to say one or the other of these good words often as she traveled on and sometimes she said them all at one time, as she pruned her wings which when folded, extended beyond her body into long, slender filaments like the antennæ.

At length, just as the maple leaves, all brown and dry, were blowing into heaps against the rosebushes and the lilacs, Mrs. Acre Tidae reached the farmhouse and slipped unobserved into the warm, clean kitchen.

She found a wide crack in the floor near the big chimney and squeezed in, digging it out to suit her body.

"The babies are all safe in their little holes by this time," she said, "safe for the winter. Perhaps by next fall they will be with me and we will all go out at night to eat crumbs," and she began singing, "Useful, cheerful—busy, hopeful." "Do hear the cricket," said Linsey, "It sounds like the one in the old log house."

"They are all alike, I guess," returned Harry, who was eating apples." "They are always jolly sad, I reckon." "Use-ful, cheer-ful, hope-ful," sang Mrs. Cricket.

ANIMALS AS PATIENTS.

M. LEPINAY, the presiding genius of the bird hospital in Paris, has found by experience that his feathered patients chiefly exhibit a tendency toward apoplexy—the dove is particularly addicted to this complaint; consumption follows in order of unpopularity, with internal complaints occupying the third place. In the case of apoplexy, bloodletting—so popular a remedy in the days of our great-grandparents—is resorted to by means of a diminutive lancet inserted in a fleshy portion of the bird, and this is followed by small doses of such drugs as quinine, bromide of camphor, etc.

Apropos of dog's teeth, about a year ago there was exhibited at a certain show a very interesting and aged schipperke, who was at that time the only dog in the world boasting a complete set of false teeth. His owner, Mr. Moseley, is a dentist as well as a lover of animals, and it is entirely due to his skill that the little dog is able to eat with perfect comfort by the aid of the artificial molars provided for him by his master, who, on another occasion, provided a dog who had lost a limb in an accident with an artificial leg. The only horse possessing a full set of false teeth was the property of Mr. Henry Lloyd of Louisville, Ky., who had its diseased teeth extracted and replaced by a set of false ones.

A swan that had had a leg run over by a cart-wheel, causing a compound fracture, was recently successfully treated at Otley, England, while yet another swan had an operation performed at Darlington some little time ago that was very much out of the ordinary. In this instance, the unlucky bird had the principal bone in its right wing fractured in several places, the fracture presumably being caused by a brutal blow dealt by some unknown ruffian. A veterinary surgeon was asked to give his advice, and on his recommendation an amputation was decided upon, and this he successfully performed. The bird, sans a wing, was, when last heard of, well on the road to recovery.

THE TRIPLET TREE.

CHARLES COKE WOODS, PH.D.

MATTER *per se* is an evidence of mind. Every material thing enshrines a thought. Essential nature has no superfluities. To the thinker everything means something. In nature nothing happens. Everything is ordered. There can be no portrait of a landscape without a painter. There can be no landscape without a maker.

The visible forms that nature takes may be changed. Her invisible forms are changeless. The search for the changeless is the great and delightful task of art, literature, science, philosophy and religion. The ultimate in nature and in art is divine. The permanent principle survives the fleeting form. Nature's principles are relatively few. Her forms are multifarious. Tree life is true life. It is natural. It is therefore true. Nature's garb may be odd. It may even be deformed. But her inner self is never false. Sap, fiber, leaf, blossom, fruit; this is nature's apocalypse. It is Queen Beauty's progressive revelation.

Trees usually grow singly. Under certain conditions they may as naturally grow otherwise. The unusual is not necessarily the unnatural. Nature's resources are vast. She may at any time manifest herself in an unfamiliar form.

A triplet tree grows on what is known as "Green's Ranch" in Cowley County, Kansas. The ranch is located five miles northeast of Arkansas City. The trees are about three hundred yards from the west bank of the Walnut River. They range in a line running north and south. They are between forty-five and fifty feet high. The first two on the north are eighteen inches apart. The third tree standing at the south end of the row is fifteen feet from the middle one. They are water elms, and average about three and one-half feet in girth. The tree standing at the north end of the row is hollow at the base and, leaning over southward intersects the central tree two feet from the ground; thence it extends to the one at the south end of the row, and intersects it with a limb from either side twelve feet above the ground. The segment of the circle described by the leaning tree is about twenty feet. At the points where the cross tree intersects the other two, it is not merely a case of contiguity, but of actual identification.

Another feature of the leaning tree is that half way between its base and the trunk of the second, and on the lower side is an unsightly knot about as large as a half bushel measure. Half way between the center tree and the one on the south, and on the under side of the leaning tree is another lump similar to the first, about half the size. These unsightly warts appear to have been produced by a congestion of sap in the tissue of the intersecting tree. This triplet tree is a curiosity. It presents a strange phenomenon in tree formation. But nature is everywhere full of mystery and surprises.

COUNTRIES DEVOID OF TREES.

ANYONE who has traveled through the comparatively treeless countries around the Mediterranean, such as Spain, Sicily, Greece, northern Africa, and large portions of Italy, must fervently pray that our own country may be preserved from so dismal a fate, says President Charles W. Eliot. It is not the loss of the forests only that is to be dreaded, but the loss of agricultural regions now fertile and populous, which may be desolated by the floods that rush down from the bare hills

and mountains, bringing with them vast quantities of sand and gravel to be spread over the lowlands.

Traveling a few years ago through Tunisie, I came suddenly upon a fine Roman bridge of stone over a wide, bare, dry river bed. It stood some thirty feet above the bed of the river and had once served the needs of a prosperous population. Marveling at the height of the bridge above the ground, I asked the French station master if the river ever rose to the arches which carried the roadway of the bridge. His answer testified to the flooding capacity of the river and to the strength of the bridge. He said: "I have been here four years, and three times I have seen the river running over the parapets of that bridge. That country was once one of the richest granaries of the Roman empire. It now yields a scanty support for a sparse and semi-barbarous population." The whole region roundabout is treeless. The care of the national forests is a provision for future generations, for the permanence over vast areas of our country of the great industries of agriculture and mining upon which the prosperity of the country ultimately depends. A good forest administration would soon support itself.—*From January Atlantic.*

SNOW PRISONS OF GAME BIRDS.

A LATE season snowstorm, with the heavy precipitation that marked the storm of Feb. 28, gives the heart of the sportsman as well as that of the bird protector a touch of anxiety on the score of the ruffed grouse and quail. A downfall of that kind, followed by a thaw and then by a freeze at night, means the death of hundreds of game birds. The quail simply get starved and cold killed, while the ruffed grouse, or partridges, get locked up by Jack Frost and die of hunger in their prisons.

There is a patch of woods not far from Delavan, Wis., where there was until recently an abundance of these game birds. There was a local snowstorm there late in February last year, which was followed by a day of sunshine and then by a frost which covered the snow with a heavy crust. Grouse have a habit of escaping from the cold and blustering winds by burying themselves in the big snow drifts at the edges of the woods. There they lie snug and warm and are perhaps loath to leave their comfortable quarters. They sometimes stay in the drift until the delay costs them their lives, the crust forming and walling them in. It so happened to sixteen partridges in the woodland patch near Delavan. With the melting of the season's snows the bodies of the birds were found. They were separated from one another by only a few feet. It was a veritable grouse graveyard.—*Tribune.*

Warm grows the wind, and the rain hammers daily,
Making small doorways to let in the sun;
Flowers spring up, and new leaves flutter gaily;
Back fly the birdlings for winter is done. —*Justine Sterns.*

THE RING-BILLED DUCK.

(Aythya collaris.)

THIS duck has many popular synonyms, among others ring-necked, ring-billed shuffler, ring-necked scaup duck, or blue-bill fall duck (Minnesota), black jack (Illinois), moon-bill (South Carolina). It is found throughout the whole of North America, south to Guatemala and the West Indies; breeding from Iowa, southern Wisconsin, Minnesota and Maine northward. It is accidental in Europe.

The chief variation in the plumage of this species consists in the distinctness of the chestnut collar in the male, which is usually well defined, particularly in front. There is very little in its habits to distinguish it from the other "black-heads." Like them, it usually associates in small flocks. Its flesh is excellent, being fat, tender and juicy.

A STRANGE BIRD HOUSE.

ADDIE L. BOOKER.

WRENS are famous for choosing queer places for nesting-sites. They will nest in almost any situation about the house or yard that can be entered through any semblance of a hole. I place all kinds of odd receptacles about the yard for them every spring, which they seldom fail to occupy. These friendly and interesting little creatures appreciate such thoughtfulness, and repay it by fairly bubbling over with grateful song.

But the pair that afforded me the most amusement pre-empted a homestead that was not intended for them.

Our acquaintance began when preparing to remove the cook stove to the summer kitchen in May. In winter this kitchen is used as a sort of lumber room, and when clearing it of various odd and ends it was found that a pair of wrens had taken possession of an overshoe and laid the foundation of a home. The pair of overshoes had been tied together and hung on a nail in the wall, about five feet from the floor.

Needless to say they were left undisturbed, though not without many doubts of the feasibility of the enterprise, on account of the proximity of the stove. The shoes were the ordinary kind, fleece-lined rubber, and were only a few feet from where the stove would be set. These conditions warranted the expectation of disastrous results from extreme heat—at least so it seemed to me, but my little neighbors thought otherwise, and nest-building progressed rapidly. Being remarkably industrious midgets, the nest of sticks was soon finished and lined with soft feathers from the poultry yard.

Wrens are noted for their industry; unless in a very restricted situation the outside dimensions of the nest are enormous when compared with the interior, or cavity. And the twigs that compose the structure are out of all proportion to the size of the architects. I have seen twigs a foot long and half the size of a lead pencil, used in the construction of their nests. That birds so diminutive could carry such burdens in their tiny bills is indeed wonderful. It is said that a single pair have been known to fill a barrel, but no nest quite so mammoth as this has ever come under my observation.

To return to the home in the shoes. After the completion of the nest five wee eggs were deposited therein, and

incubation began. And in spite of the heat everything went on happily in this unique domicile.

We soon became the most sociable friends. Their quaint and charming ways made them very amusing pets. They became so tame that they would approach me fearlessly, even alighting on my head, and would let me examine their nest without being frightened.

The wren is a very lively and active bird, and sings incessantly throughout the breeding-season, and these were not an exception, but were forever darting in and out, their actions accompanied by a sweet warble. Mr. Wren would positively quiver all over with delight, while regaling Mrs. Wren and me with his exuberant melody. They were the cheeriest little companions imaginable. Every morning as I entered the kitchen I was greeted heartily by my small neighbors, who bustled about in the preparation of the morning meal as busily as I. Meanwhile Mr. Wren merrily sang his innocent matin song, and spontaneously I would find myself singing too, as I went about my work.

One day there was great excitement in the shoe and, when I looked in, five featherless mites with huge mouths were to be seen. Mrs. Wren was now a veritable "old woman who lived in a shoe." But she did not treat her children as did the old woman of nursery fame, though she was kept very busy in supplying their wants, even with the assistance of Mr. Wren.

These birds subsist on small insects and consume a considerable quantity. With much satisfaction I watched them slay a host of ants that were invading the kitchen; running up and down the wall with much agility, they picked the ants off.

Real warm weather had set in by the time the nestlings were ready to try their wings, and I thought, of course, my friends would desert me for a cooler resort out of doors, in which to pass the heated term. But O, no, they were too loyal for that, so to make their house more commodious, another room was added by building a nest in the other shoe. And the family raised in the second shoe was not a whit less interesting than the first.

THE CHICKADEE.

SIDNEY DAYRE.

"Were it not for me,"
Said a chickadee,
"Not a single flower on earth would be;
For under the ground they soundly sleep
And never venture an upward peep,
Till they hear from me,
Chickadee-dee!

"I tell Jack Frost when 'tis time to go
And carry away the ice and snow;
And then I hint to the jolly old sun,
'A little spring work, sir, should be done.
And he smiles around
On the frozen ground,
And I keep up my cheery, cheery sound,
Till echo declares in glee, in glee,
'Tis he! 'tis he!
The chickadee-dee!

"And then I waken the birds of spring—
'Ho, ho! 'tis time to be on the wing.'
They trill and twitter and soar aloft,
And I send the winds to whisper soft,
Down by the little flower-beds,
Saying, 'Come show your pretty heads!
The spring is coming, you see, you see!
For so sings he,
The chickadee-dee!"

The sun he smiled; and the early flowers
Bloomed to brighten the blithesome hours,
And song-birds gathered in bush and tree;
But the wind he laughed right merrily,
As the saucy mite of a snowbird he
Chirped away, "Do you see, see, see?
I did it all!
Chickadee-dee!"

REFLECTIONS.

CHARLES C. MARBLE.

Vice often epitomizes ancestry.

The wisest are not so wise as silence.

Experience is the grave of enthusiasm.

Experience is the enemy of dogmaism.

Our faith is often nothing more than ur hope.

Should we despise anything that God as made?

In bestowing benefits we imperil riendship.

Innocence and guilt are alike sufused with blushes.

If vice did not exist wisdom could ot predicate itself.

Disappointment leaves a scar which ope cannot remove.

Success is an excellent proof of the isdom which achieved it.

The vices of some men are more enurable than the virtues of others.

Beauty is a reproach without virue, while virtue is itself the highest eauty.

The sun at noon gives no more light han at morn, but its glow has more armth and power.

Without the accessories life were of ittle worth, and hope gives it its permanence and serenity.

Marriage should be in harmony with ature, in which what is seemingly disordant but illuminates and purifies it.

Our conduct toward one another hould be based upon a conception of he infinite mischances of life and the xquisite poignancy of regret.

Misfortune seeks consolation in communicating itself. But when it no onger needs sympathy it is silent, and shamed of its former volubility.

We can overcome even our prejudices where some interest is subserved y it. So much stronger is self-interst than color, social status, or educaion.

The poet should know, better than another, his limitations. Parnassus is always higher than our dreams, and his summit more radiant than the vision of any mortal.

The lily of the valley, which hides its chaste head in dewy leaflets, is a thousand times less modest than the maiden whose conscious blush reveals the innocence of reason.

If we were to judge all men by what they seem to have achieved, we would be harsh and unjust. We cannot always see the scar left by a heroic deed, and modesty conceals it.

Complete benevolence implies simplicity of living. The Christian cannot have if he knows that others have not. Thoreau was perhaps the wisest man of his time; he practiced what he preached; and there are few examples of simplicity to compare with his.

Nothing, perhaps, is more humiliating than to observe the precocious development of the negative virtues, especially prudence. There is a subtle suspiciousness in early prudence which is at war with all generous impulses. Think of the pinched heart of a little miser.

There is a selfishness which deals generously with its own: my wife, my child shall be arrayed in the richest, shall feed upon the daintiest; my servant, my handmaid they are naught to me. Nature hath made nothing better than my desert; she hath made nothing poor enough for thee and thine.

In an old man conceit may be so comprehensive as to include the race. Has he been reasonably successful with the fair sex, all are the subjects of his whim or desire; and he will sententiously and confidently repel any claim of virtue or purity. So blind is he to the centuries made splendid by her virtue and self-sacrifice, and so little is his judgment affected by objects unconnected with self.

FOXGLOVE.

(*Digitalis purpurea L.*)

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy.

Pan through the pastures often times hath runne
To plucke the speckled fox-gloves from their stems.
—*W. Browne, Britannias Pastorals, II. 4.*

THE fox-glove is a biennial herb from two to seven feet in height with a solitary, sparingly branched stem. The basal leaves are very large and broad, gradually becoming narrower and smaller toward the apex of the stem and its branches, dark green in color, pubescent, margin dentate, venation very prominent. The inflorescence is very characteristic. The large, numerous flowers are closely crowded and pendulous from one side of the arched stalk. The corolla is purple and spotted on the inside. It is a very handsome plant, widely distributed, preferring a sandy or gravelly soil in open woods. When abundant and in full bloom it makes a beautiful exhibit. It is a garden favorite in many lands.

This plant is apparently not mentioned in the works of older authors. It was not known to the ancient Greeks and Romans. It was, however, used medicinally in the northern countries of Europe since very remote times. The Anglo-Saxon word fox-glove is derived from the Welsh (11th century), *foxes-glew*, meaning fox music in allusion to an ancient musical instrument consisting of bells hung on an arched support. In the Scandinavian idioms the plant bears the name of foxes' bells. The German name *Fingerhut*, meaning finger hat, hence thimble, is derived from the resemblance of the flower to a thimble. Still more poetical is the name *Wald-glöcklein*, meaning little forest bells, in reference to the inflorescence. In England the flowers are known as foxes' fingers, ladies' fingers and dead men's bells.

According to an old English work on medicine the early physicians of Wales and England applied this drug externally only. It was not until 1775 when the English physician Withering began to use it internally, especially in the treatment of hydrophobia. Modern physicians consider digitalis one of the most important medicinal plants. It is a very powerful, hence very poisonous drug, its action being due to an active principle known as *digitalin*. Its principal use is in the treatment of deficient heart action due to various causes but especially when due to valvular lesions. The physician must, however, observe great care in its administration, not only because of its powerful action but also because of its "cumulative action;" that is, the effect of the drug increases although only normal medicinal doses are given at regular intervals, so that fatal poisoning may result, especially if the patient should attempt to rise suddenly. The physician guards against this by gradually decreasing the dose or by discontinuing it for a time and by requiring the patient to remain in a recumbent position while under the influence of the drug.

For medicinal use the leaves from the wild-growing plants are preferred because they contain more of the active principle. The leaves are collected when about half of the flowers are expanded and, since it is a biennial, that would be during the second year. The first year leaves are, however, often used or added. Like all valuable drugs it is often adulterated, the leaves of *Inula Conyza* (ploughman's spikenard), *Symphytum officinale* (comfrey), and *Verbascum Thapsus* (mullein) being used for that purpose. The odor of the bruised green leaves is heavy or nauseous, while that of the dried leaves is fragrant, resembling the odor of tea.

DIGITALIS

The taste is quite bitter. Formerly the roots, flowers and seeds were also used medicinally.

DESCRIPTION OF PLATE.—*A B*, plant somewhat reduced. 1, flower; 2, 3, 4, stamens; 5, pollen; 6, 7, style and stigma; 8, 9, ovary; 10, fruit; 11, 12, 13, seed.

FRUIT BATS OF THE PHILIPPINES.

THE Agricultural Department at Washington is taking precautions to prevent the importation into the United States of any of the animal pests which are found in Porto Rico, the Philippines, and the other new colonies. Among these none is more feared than the great fruit bats which abound in the Philippines. A full grown specimen of the fruit bat measures five feet from tip to tip of its wings. The fruit bats live together in immense communities and feed almost altogether on tropical and subtropical fruits. They crowd together so thickly on the trees that sometimes large branches are broken down by their weight. In Australia they have increased so rapidly that great sums of money have been spent in their destruction, one organized movement of the fruit growers of New South Wales recently resulting in the killing of 100,000 bats at a cost of 30 cents each. Another possible immigrant which is much dreaded is the mongoose, which abounds in Cuba, Porto Rico, and the other West Indian Islands. The mongoose was first brought to the islands for the purpose of destroying the rats and mice, which it did so thoroughly that it was soon forced to adapt itself to another diet. It was found that the mongoose thrived on young poultry, birds, and even young pigs and lambs, while it also consumed great quantities of pineapples, bananas, corn and other vegetable products.

MONKEYS AS GOLD FINDERS.

CAPTAIN E. MOSS of the Transvaal tells the following story of the monkeys who work for him in the mines: "I have twenty-four monkeys," said he, "employed about my mines. They do the work of seven able-bodied men. In many instances they lend valuable aid where a man is useless. They gather up the small pieces of quartz that would be passed unnoticed by the workingmen, and pile them up in little heaps that can easily be gathered up in a shovel and thrown into a mill. They work just as they please, sometimes going down into the mines when they have cleared up all the debris on the outside. They live and work together without quarreling any more than men do. They are quite methodical in their habits, and go to work and finish up in the same manner as human beings would do under similar circumstances. It is very interesting to watch them at their labor, and see how carefully they look after every detail of the work they attempt. They clean up about the mines, follow the wheelbarrows and carts used in mining and pick up everything that falls off on the way."—*Tit Bits.*

A PLEA FOR THE TREES.

ANNE WAKELY JACKSON.

MUCH has been written, and more has been said, in regard to the "prevention of cruelty to children," and the "prevention of cruelty to animals;" but has anyone ever urged upon the public the prevention of cruelty to *trees?*

It is time someone did, for people nowadays seem to have no regard whatever for a tree's feelings, but saw and hack a limb off here or there at any season of the year the notion happens to seize them, and leave the poor thing maimed and disfigured, and perhaps pouring out its life-blood from the ugly wound.

If you are insensible to the beauty, the blessing and benignity of trees, there is no use in appealing to you. But surely you are not! Surely you can call to mind some old tree that brings up memories of the past, and appeals to you with almost human tenderness!

Then, for the sake of these old, tried, and well-beloved friends, look with compassion upon all trees, and discourage those who would spoil and disfigure them.

Have you ever thought how sad a tree must feel when it is transplanted from the forest to the city or town? How it must miss its tall and stalwart companions the shy woodland birds, and the flowers that spring up around it each year! The parting from them all is bad enough, but there is worse to come. It little dreams of the hideous and deforming "trimming" that will begin as soon as it commences to spread its tiny branches! Poor little tree! I wonder it does not die of grief and pain!

Doubtless, it sighs and sobs out its longing for the old free home, in the ears of the passing wind, though we are too dull to understand its murmuring voice.

If the wind is in a good humor, he caresses it gently, and tries to comfort it; but sometimes he is angry, and then he shakes the poor tree fiercely. But it loves him always, whether he is gentle or rough.

I suppose it is sometimes necessary to trim trees. I hear people say so. But I think a tree of beautiful and perfect shape is more desirable than the little patch of lawn that might be gained by "trimming it up."

Ought not one to consider, and carefully study the tree, as a whole, before venturing to remove any of its branches? To examine it from every point of view? Above all, if your trees *must* be trimmed, see about it *yourself*, and don't trust them to the ruthless hands of people insensible to beauty—those to whom a tree is only so much wood! And be very sure your "cause" is "justifiable" before you allow them to be touched.

Remember that the finest trees are of slow growth; and if ever you are tempted to cut down a really fine one, just stop a moment and reflect that it may take half a lifetime to replace it.

If these people who have a mania for cutting down trees could but be persuaded to plant a new one for every old one they sacrifice, what a blessing it would be to future generations!

Then as a little helpless, innocent bird,
That has but one plain passage of few notes,
Will sing the simple passage o'er and o'er
For all an April morning, till ear
Wearies to hear it. —*Tennyson.*

The sycophant succeeds where the self-respecting man fails, yet the former is despised and the latter revered. The first is happy if he secure the favor of the great; the latter is content if he can secure that of himself.—*Charles Churchill Marble.*

"THAT I MAY HELP."

The depth and dream of my desire,
The bitter paths wherein I stray,
Thou knowest, Who hast made the fire,
Thou knowest, Who hast made the clay.

One stone the more swings to her place
In that dread temple of Thy Worth,
It is enough that through Thy grace
I saw naught common on Thy earth.

Take not that vision from my ken;
O, whatsoe'er may spoil or speed,
Help me to need no aid from men
That I may help such men as need.

—*Rudyard Kipling.*

A TRAGEDY IN THREE PARTS.

PART I.—*The Bonnet.*

A bit of foundation as big as your hand;
Bows of ribbon and lace;
Wire sufficient to make them stand;
A handful of roses, a velvet band—
It lacks but one crowning grace.

PART II.—*The Bird.*

A chirp, a twitter, a flash of wings,
Four wide-open mouths in a nest;
From morning till night she brings and brings
For growing birds, they are hungry things—
Aye! hungry things at the best.

The crack of a rifle, a shot well sped;
A crimson stain on the grass;
Four hungry birds in a nest unfed—
Ah! well, we will leave the rest unsaid;
Some things it were better to pass.

PART III.—*The Wearer.*

The lady has surely a beautiful face,
She has surely a queenly air;
The bonnet had flowers and ribbon and lace;
But the bird had added the crowning grace—
It is really a charming affair.

Is the love of a bonnet supreme over all,
In a lady so faultlessly fair?
The Father takes heed when the sparrows fall,
He hears when the starving nestlings call—
Can a tender woman *not care?*

—*Anon.*

STRANGE PLANTS.

ONE of the most remarkable growths in the government botanical gardens is the so-called barber plant, the leaves of which are used in some parts of the East by rubbing on the face to keep the beard from growing. It is not supposed to have any effect on a beard that is already rooted, but merely to act as a preventive, boys employing it to keep the hair from getting a start on their faces. It is also employed by some Oriental people who desire to keep a part of their heads free from hair, as a matter of fashion. A curious looking tree from the Isthmus of Panama bears a round red fruit as big as an apple, which has this remarkable faculty, that its juice rubbed on tough beef or chicken makes the meat tender by the chemical power it possesses to separate the flesh fiber. One is interested to observe in the botanical green houses three kinds of plants that have real consumption of the lungs—the leaves, of course, being the lungs of a plant. The disease is manifested by the turning of the leaves from green to white, the affection gradually spreading from one spot until, when a leaf is all white, it is just about to die. Cruelly enough, as it would seem, the gardeners only try to perpetuate the disease for the sake of beauty and curiosity, all plants of those varieties that are too healthy being thrown away.

A BRIGAND BIRD.

THE kea is an outlaw bird of New Zealand for each of whose bills the government offers a reward of a shilling. The kea is a gourmand. It prefers the kidney of a sheep to any other part of the beast.

Coming down out of the mountains in winter, it attacks the sheep, alighting on their backs, and tearing away the hide and flesh until it reaches the titbits which it seeks.

How the birds learned to tear away the skin to get at the flesh forms a curious story of the development of bird knowledge. The birds had been feeding on the refuse of cattle and sheep killed for human consumption. They learned to associate the idea of meat with the living animal, and now they kill the sheep for the meat without waiting for human aid or consent.

The Maoris have a legend about this bird to the effect that it used to be a strict vegetarian, building its nest on the ground. The sheep came and trampled on the nests, and the birds attacked them furiously, drawing blood.

They liked the flavor of flesh, and have ever since been eating it. The bird builds its nest in trees now, out of the reach of the sheep's hoofs.

THE BROOK.

Little brook, little brook,
You have such a happy look,
Such a very merry manner as you swerve and curve and crook;
And your ripples, one by one,
Reach each other's hands and run
Like laughing little children in the sun!

Little brook, sing to me,
Sing about a bumble-bee
That tumbled from a lily-bell and mumbled grumblingly
Because he wet the film
Of his wings and had to swim,
While the water bugs raced round and laughed at him.

Little brook, sing a song
Of a leaf that sailed along
Down the golden braided center of your current swift and strong,
And the dragon-fly that lit
On the tilting rim of it,
And sailed away, and wasn't scared a bit!

And sing how oft in glee
Came a truant boy like me
Who loved to lean and listen to your lilting melody,
Till the gurgle and refrain
Of your music in his brain
Caused a happiness as deep to him as pain!

Little brook, laugh and leap!
Do not let the dreamer weep;
Sing him all the songs of summer till he sink in softest sleep;
And then sing soft and low
Through his dreams of long ago,
Sing back to him the rest he used to know.—*Anon.*

BLOODROOT.

BY PER. HARRIET E. HIGLEY.
A. W. MUMFORD, PUBLISHER, CHICAGO.

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THE BLOOD-ROOT.

WILLIAM KERR HIGLEY,
Secretary of the Chicago Academy of Sciences.

Thou first-born of the year's delight,
Pride of the dewy glade,
In vernal green and virgin white,
Thy vestal robes arrayed.—*Keble.*

THE true lover of flowers, though he may be enraptured by those under cultivation, finds a greater satisfaction in the study and observation of those that are developed only under the influence of Nature's laws. In the field, the forest, and even in the sea there are plants not only pleasing to the eye, but that are doubly interesting because of the wonderful provision made for them to assure their survival. Plants, like animals, have their enemies, and sometimes it seems that, with thoughtful care for its own protection, a species will gradually change its habits, thus conveying a sense of danger to its descendants.

Many of the peculiarities of plants, that fit them for existence, may be readily studied by the novice in botany as he tramps the fields in search of recreation. There is nothing more delightful and charming to the botanist than to seek the reasons for the beauties in Nature and to find why plants live and exist as they do.

Many delicate plants seek the shelter and protection of the borders of the forest. They do not penetrate far within, but remain near the open, where the sunlight can reach them. The blood-root (*Sanguinaria Canadensis*) is of this character. Beautiful and delicate, it seems to shun the storm and wind and to retire from the gaze of man.

The blood-root belongs to the poppy family (*Papaveraceæ*), which includes about twenty-five genera and over two hundred species. These, though widely distributed, are chiefly found in the temperate regions of the North. To this family also belong the valuable opium-producing plant (*Papaver somniferum*), the Mexican or prickly poppy (*Argemone Mexicana*), the Dutchman's breeches (*Bicuculla Cucullaria*), the bleeding-heart (*Bicuculla eximia*) and the beautiful mountain fringe (*Adlumia fungosa*). A large number of the species are cultivated for ornamental purposes. The poppy is also cultivated for the commercial value of the opium it produces. All the species produce a milky or colored juice. Here, indeed, we may say that behind beauty there lurks a deadly foe, for the juice of nearly all the species has active narcotic properties. This property is a means of protection to the plant under consideration, for its acrid taste is distasteful to animals.

The red juice that exudes from all parts of the plant of the blood-root gives it both its common and its generic names, the latter, *Sanguinaria*, is derived from the Latin word *sanguis*, or blood.

This interesting plant is a native of Eastern North America, deriving its specific name from the fact that it is found in Canada. It blossoms in April or May. Usually but a single flower is borne by the naked stalk that rises from the underground stem to the height of about eight inches. The flowers are white, very rarely pinkish, about one and one-half of an inch in diameter. The number of petals varies from eight to twelve, and they fall very soon after expansion. The sepals disappear before the bud opens.

A single leaf is produced from each bud of the underground stem. It is wrapped around the flower-bud as the latter rises from the soil and does not develop to full size till after the period of blossoming is over. The necessary

food material for the production of the flower was stored in the underground stem during the preceding season. Thus the green leaf is not needed early in the growth of the plant.

The adult leaf is kidney-shaped, smooth, and five to nine lobed. When fully grown they are often more than six inches in diameter. The leaf-stalk, which may be over one foot in length, and the radiating veins vary in color from yellowish to orange. Few leaves are more beautiful and graceful than these, both during their development and when fully mature.

It is said that the Indians formerly used the juice of this plant as a dye, and thus it is sometimes called red Indian paint and red puccoon.

TANSY CAKES.

MANY of our garden herbs still in common use for purposes of seasoning are in reality British plants, says Longman's Magazine. Among them may be mentioned mint and marjoram and thyme and calamint, all of which may be found in their native haunts. Fennel is abundant on sea cliffs in many places in the south of England. Wild hyssop is perfectly naturalized on the picturesque ruins of Beaulieu Abbey and wild balm used to be found within the ancient walls of Portchester castle. The garden parsley was formerly abundant on the shingly beach at Hurst castle, where it used to be gathered for domestic purposes. One native herb, however, much in use among our forefathers is now seldom seen in kitchen gardens—we mean *Tanacetum vulgare*, the common tansy, the dull yellow flowers of which are often conspicuous by the side of streams. The young leaves and juice of this plant were formerly employed to give color and flavor to puddings, which were known as tansy cakes, or tansy puddings.

In mediæval times the use of these cakes was specially associated with the season of Easter and it is interesting to notice that in the diet rolls of St. Swithin's monastery at Winchester, which belong to the end of the fifteenth century, we come across the entry "tansey tarte." It has been said that the use of tansy cakes at this season was to strengthen the digestion after what an old writer calls "the idle conceit of eating fish and pulse for forty days in Lent," and it is certain that this was the virtue attributed to the plant by the old herbalists. "The herb fried with eggs which is called a 'tansy,'" says Culpepper, "helps to digest and carry away those bad humors that trouble the stomach." It seems more probable that the custom of eating tansy cakes at Easter time was associated with the teaching of that festival, the name "tansy" being a corruption of a Greek word meaning "immortality."

THE PARTRIDGE CALL.

Shrill and shy from the dusk they cry,
  Faintly from over the hill;
Out of the gray where shadows lie,
Out of the gold where sheaves are high,
Covey to covey, call and reply,
  Plaintively, shy and shrill.

Dies the day, and from far away
  Under the evening star
Dies the echo as dies the day,
Droops with the dew in the new-mown hay,
Sinks and sleeps in the scent of May,
  Dreamily, faint and far.

—Frank Saville in the Pall Mall Magazine.

OUR FEATHERED NEIGHBORS.

BERTON MERCER.

SOME few years ago, while living in the village of West Grove, Chester County, Pennsylvania, I observed an unusual number of different birds in our own immediate yard and garden, nearly all of which built their homes within the narrow limits of our property.

Being deeply interested in the bird kingdom, and appreciating their friendship and confidence, I carefully watched the progress of their daily labors and their respective traits and individual habits. Our buildings consisted of a house, small stable and a carpenter shop, and I was much gratified to observe so many pretty birds nesting at our very doors.

In the front yard stood three tall pine trees. In one of these a pair of black birds made their nest and reared two broods of young. A goldfinch also chose one of the lower branches of the same tree, in the forks of which the clever little fellow hung a most beautiful cup-shape nest. It appeared to be made of various mosses, lichens, and soft materials, closely woven and cemented together, and the lining inside consisted of thistle-down. Four pretty eggs were deposited in due course and, as far as I know, the young were safely raised and departed with their parents in the fall. I had the pleasure of seeing the entire family frequently perched on the seed salad stalks in our garden feeding in fearless content.

On both sides of the front porch was a lattice covered with woodbine. In the top of one of these a robin chose to build her home, and showed remarkable tameness during the entire nesting period. On the back porch, also covered with woodbine, a pair of chipping sparrows built their nest, a beautiful little piece of workmanship, displaying skill and good taste. A happy little family was raised here in safety. Not ten feet from the chipping sparrow's nest, we nailed up a little wooden box which was tenanted for several years by a pair of house wrens, in all probability the same two. These little birds afforded us many hours of pleasure watching their cunning ways and listening to their cheery song.

In another box raised on a high pole in the garden, we had a pair of purple martins for two seasons and they helped to swell the population of our bird community. Placed in a hedge row bordering the yard, I observed the nest and eggs of a song sparrow, and their happy notes were to be heard all day long. In a small briar patch in the corner of the garden a cat bird made her home, and became quite tame, raising four little ones successfully. In the eaves of the shop (although not wanted or cherished) the English sparrows held sway and we destroyed their nests on two or three occasions, as they repeatedly tried to drive away some of our other pets.

Summing up we have a total of nine different birds which nested within our small domain, and in each instance they seemed to feel a sense of security and protection from all harm. In addition to those nesting on our premises, we were favored with frequent visits from many more, such as vireos, orioles, cardinals, indigo birds, chickadees, nuthatches, snow birds, sparrow hawks, flickers, etc., according to the time of year.

Prior to the summer in question, my father had been very ill, and as he was then getting better he spent many days on the porch. This afforded ample opportunity for him to study our birds, and they in like manner became so accustomed to his presence that they were quite fearless. Especially was this the case with the chipping sparrows above mentioned. They became unusually tame during the season and the mother bird finally ate out of father's hand or would sit on the toe of his boot and pick crumbs from his fingers.

THE BLUE GROSBEAK.

(*Guiraca cærulea.*)

THIS beautiful specimen of the finch family is found in the southern United States from the Atlantic to the Pacific, although very local and irregularly distributed. It is occasionally found north to Kansas, Illinois, Pennsylvania and Connecticut. The male is brilliant blue, darker across the middle of the back. The female is yellowish brown above, brownish yellow beneath, darkest across the breast, wings broadly edged with brownish yellow. Sometimes there is a faint trace of blue on the tail. The young resemble the female. Males from the Pacific coast region have tails considerably longer than eastern specimens, while those from California are of a much lighter and less purplish blue.

The blue grosbeak is a very inconspicuous bird. Unless seen under the most favorable circumstances the adult male does not appear to be blue, but of a dusky color, and Ridgway says may easily be mistaken for a cow blackbird, unless carefully watched; besides they usually sit motionless, in a watchful attitude, for a considerable time, and thus easily escape observation.

The blue grosbeak frequents the thickets of shrubs, briars and tall weeds lining a stream flowing across a meadow or bordering a field, or the similar growth which has sprung up in an old clearing. The usual note is a strong harsh *ptchick*, and the song of the male is a very beautiful, though rather feeble, warble. At least two broods are raised during a season.

ODD PLACES CHOSEN.

GUY STEALEY.

IT would seem that nature had provided enough space and a sufficient variety of nooks and corners for birds to choose from and build their nests in; yet it is a strange fact that many of them often prefer to follow man, and select, for their homes, some spot he has planned and made.

In the fields one often sees the nests of robins and blackbirds built between the rails of pole fences, and sometimes catbirds choose this situation for a home. Around the barns will be found the swallows and their curious nests of mud. Then there are those cheerful and always friendly little birds, the wrens, which think that our houses are just the homes they would like, too; and any box or can, or what is prettiest of all, a miniature cottage placed on a fence, will rarely ever remain unoccupied during the summer. Even the shy bluebirds, whose sheen of feathers seems to be borrowed from the sky, like to peep into these.

Of all the wild birds, I believe I love the wrens the best. They are always so busy and yet so companionable. Last spring, when the days began to get warm, I left the window of my room open to admit the fresh free air; and on going in there one day I spied one of these spry little fellows peeping and hopping around the curtains, which were looped up, forming a cozy recess. He did not seem to be alarmed at my presence, but calmly went on with his inspection; and would you believe it, the next morning the pair of them were busy constructing their nest in this nook. I let the window remain open all summer, and they raised their family there.

But the strangest of all strange sites in which I ever found a nest was nearly at the bottom of a deep well! This well was walled up with rock and a couple of brown field birds carried twigs and grass down it and formed their nest on a projecting spur of stone. Why they should choose such a location as this it is hard to tell.

THERE are other armies in South Africa besides the Boers and the British; armies of very little folk, which go out on foraging expeditions when their colonies stand in need of supplies—forays planned and executed with military precision, and, as a general thing, uniformly successful.

I speak of an army of ants.

A close observer, residing in South Africa, describes one of these forays in the following way:

"The army, which I estimated to number about fifteen thousand ants, started from their home in the mud walls of a hut and marched in the direction of a small mound of fresh earth, but a few yards distant. The head of the column halted on reaching the foot of the mound and waited for the rest of the force to arrive at the place of operations, which evidently was to be the mound of fresh earth. When the remainder had arrived and halted so that the entire army was assembled, a number of ants detached themselves from the main body and began to ascend to the top of the mound, while the others began moving so as to encircle the base of the mound.

"Very soon a number from the detachment which had ascended the mound, or lilliputian kopje, evidently the attacking party, entered the loose earth and speedily returned, each bearing a cricket or a young grasshopper, dead, which he deposited upon the ground and then returned for a fresh load. Those who had remained on the outside of the mound, took up the crickets and grasshoppers as they were brought out and bore them down to the base of the hill, returning at once for fresh victims. Soon the contents of the mound seemed to be exhausted, and then the whole force returned home, each ant carrying his burden of food for the community."

My very young readers will be surprised, no doubt, to hear me speak of wasps as cement-makers, or paper-makers, but such, in truth, they are. You can form no idea of the industry and toil these little folk expend upon the structure they call home. Nothing pleases them better than to find an old fence rail covered with a light gray fuzz of woody fiber loosened from decaying wood by excessive soakings of rain. Dozens of these little pulp-gatherers will descend upon the rail, and as fast as each of them obtains a load away he flies to the place where the home building is already going on.

This may be in a clump of bushes near a stream, and as fast as they deposit their load of fiber down they fly to the stream, and having secured a mouthful of water back they go to the nest to beat the fiber into a thin sheet, which they deftly join to the main body, the jointure being imperceptible. Such a throng of workers coming and going, some to the fence, some to the nest, some to the brook, each addition to the structure being the tiniest mite, yet growing perceptibly under the united efforts of the little builders.

TAR.—One of the commonest substances met with in city or town is tar. A paper roof covered with tar makes a very good protection against sun and rain provided a suitable amount of gravel covers the tar. The kind of tar most used is called coal-tar or gas-tar. This is made at the gas factory from the distilling of soft coal. Tar that comes from different varieties of pine and spruce is used to cover ropes and hulls of ships. It is from his having some of it usually clinging to his hands and clothes that the sailor boy came to be called "Jack Tar," and from his fondness for the sea one of the royal family of England got the pet name of "Royal Tarry Breeks." It is strange that there has been no change in the work of getting this kind of tar from the wood for over twenty-three hundred years. The wood is placed in holes dug in the ground and covered carefully with turf so as to keep out the air and prevent too much burning. Some of the wood is left free so the air may get at it and burn it enough to make heat enough to distil the pitch from the rest

of it. This is gathered into barrels and is black because of the smoke that gets into it. It was this sort of tar that Benjamin Franklin had his experience with one time in Philadelphia. He was running along on the tops of tar barrels on the wharf one fine day with his Sunday clothes on. The head of one barrel was not in good condition, and so Benjamin went down into it. The next issue of his paper had a very amusing account of the accident in which Franklin used his powers to make puns to great advantage in making fun at his own expense.

ANTS.—Would you like to get a clean skeleton of any small animal? Place the body near or upon an ant hill and the little workers will clean it off for you perfectly, picking every bone as clean as if they were under contract with a forfeit for every scrap of flesh, skin, or sinew left upon any bone. They like meat so well that they will attack animals that are many times larger than themselves and carry the work to a successful end. There are three kinds of ants in an ant hill—males, females, and neuters. The males and females have wings and do no work to speak of. They are always waited upon very carefully by the neuters who have no wings, but are noted for their industry, skill, and strength. It has been said that the ant stores up large quantities of grain in the summer for winter use. Whoever said that was not well acquainted with his subject. In winter the ants neither eat nor work. Some of the neuters have their jaws, or mandibles, made much larger than the rest. These are the soldiers, and they fight with greater fierceness than any other creatures. Huber, the blind naturalist who told the world so many astonishing things about bees, describes a great fight he once saw between two colonies of these little warriors. "I shall not say what lighted up discord between these two republics, the one as populous as the other. The two armies met midway between their respective residences. Their serried columns reached from the field of battle to the nest, and were two feet in width. The field of battle, which extended over a space of two or three square feet, was strewn with dead bodies and wounded; it was also covered with venom, and exhaled a penetrating odor. The struggle began between two ants, which locked themselves together with their mandibles, while they raised themselves upon their legs. They quickly grasped each other so tightly that they rolled one over the other in the dust. When night came they stopped fighting, but the next morning they went at it again and piled the ground with slain and wounded." Their stings hurt because they carry a liquid that is like that found in nettles and in the hairs and other parts of certain caterpillars. This is called formic acid, and is made by chemists for certain purposes. The red ant dislikes to work if he can get slaves to do it for him. Perhaps we should say if *she* can get it done for *her*, because these neuters are rather more like females than like male ants. They make war purposely to get into the homes of other colonies to carry away their eggs and baby ants. They bring these up to wait upon them. When they go on a journey the slaves have to carry their owners, and sometimes they even feed them until they refuse to feed themselves. They have been known to die of hunger with plenty of food within easy reach, but with no slave at hand to place it before them. In going out to fight for the offspring of other ants they go in regular columns, and those that are left after the slaughter return home in the same order, their solid trains sometimes extending more than a hundred feet. Some ants keep cows. Plant lice have honeydew in their bodies, and when well fed they give out a great deal of it. Ants are fond of it. They sometimes confine the plant lice, feed them, and milk the honey-dew from the bodies of their captors. A German scientist named Simon, has recently returned from Australia with some great stories about ants. He says he suffered much from their attacks. In trying to get rid of them in many ways he at last hit upon the idea of spreading a poison where they would have to pass across it. He used

prussiate of potash which is sometimes used in photography. Another name for it is cyanide of potassium. He says, "How astonished was I when I saw the whole surface of the heap strewn with dead ants like a battle-field. The piece of cyanide, however, had totally disappeared. More than one-half of the community had met death in this desperate struggle, but still the death-defying courage of the heroic little creatures had succeeded in removing the fatal poison, the touch of which must have been just as disagreeable to them as it was dangerous. Recklessly neglecting their own safety, they had carried it off little by little, covering every step with a corpse. Once removed from the heap, the poison had been well covered with leaves and pieces of wood, and thus prevented from doing further damage. The heroism of these insects, which far surpasses what any other creature, including even man, has ever shown in the way of self-sacrifice and loyalty, had made such an impression on me that I gave up my campaign, and henceforth I bore with many an outrage from my neighbors rather than destroy the valiant beings whose courage I had not been able to crush." In the extreme southwest of the United States are colonies of ants that have a peculiar custom of setting apart some of their number to give up their lives for their fellows in a strange way. They feed upon honey until they are unable to walk. Then their fellows take the greatest care of them and feed them so their bodies are distended enormously. A number of these ants when fed so highly look very much like a bunch of little grapes, they are so round and translucent. When food is scarce later the other ants come to their heavy mates and eat them with great relish.

AIR.—The wear and tear in our bodies is replaced by new material carried to the spot by the blood. The heart forces the blood out along the arteries in a bright red current. It comes back blackened with the refuse material. It passes to the lungs, where it comes into contact with the air we breathe. It does not quite touch the air, but is acted upon by the air through very thin partitions much as the cash business is carried on in some houses and banks with the cashiers all placed behind screens, where they may be seen and talked to but not reached. Purified in the lungs by contact with fresh air, the blood goes back to continue the good work of making the body sound. But if the air has been used before by someone in breathing it has become bad and the blood does not get the benefit from contact with it in the lungs that nature intended. Ordinarily a man breathes in about four thousand gallons of air in a day if he is taking things easily, but when he is hard at mental or physical work he needs much more than this. Air that has been hurt by being breathed is restored to the right condition by the leaves of trees and plants. In large cities where people are crowded together there is a lack of good air. But nature is continually rushing the air about so that new may take the place of what has been used, rain washes it out, and the storm brings in from the country just the kind of air the city man needs in his lungs.

BIRD LIFE IN INDIA.

IN INDIA bird-life abounds everywhere absolutely unmolested, and the birds are as tame as the fowls in a poultry yard. Ring-doves, minas, hoopoes, jays and parrots hardly trouble themselves to hop out of the way of the heavy bull-carts, and every wayside pond and lake is alive with ducks, geese, pelicans, and flamingoes and waders of every size and sort, from dainty beauties, the size of pigeons, up to the great unwieldly cranes and adjutants, five feet high.

IRELAND'S LOST GLORY.

THERE is perhaps no feature of Irish scenery more characteristic and depressing than the almost universal absence of those tracts of woods which in other countries soften the outlines of hills and valleys. The traveler gazing on its bald mountains and treeless glens can hardly believe that Ireland was at one time covered from shore to shore with magnificent forests. One of the ancient names of the country was "The Isle of Woods" and so numerous are its place-names derived from the growth of woods, shrubs, groves, oaks, etc., that (as Dr. Joyce says) "if a wood were now to spring up in every place bearing a name of this kind the country would become clothed with an almost uninterrupted succession of forests." On the tops of the barest hills and buried in the deepest bogs are to be found the roots, stems and other remains of these ancient woods, mostly of oak and pine, some of the bogs being literally full of stems, the splinters of which burn like matches.

The destruction of these woods is of comparatively recent date. Cambrensis, who accompanied Henry II. into Ireland in the twelfth century, notices the enormous quantities of woods everywhere existing. But their extirpation soon began with the gradual rise of English supremacy in the land, the object in view being mainly to increase the amount or arable land, to deprive the natives of shelter, to provide fuel, and to open out the country for military purposes. So anxious were the new landlords to destroy the forests that many old leases contain clauses coercing tenants to use no other fuel. Many old trees were cut down and sold for twelve cents. On a single estate in Kerry, after the revolution of 1688, trees were cut down of the value of $100,000. A paper laid before the Irish houses of parliament describes the immense quantity of timber that in the last years of the seventeenth century was shipped from ports in Ulster, and how the great woods in that province (290,000 trees in all) were almost destroyed.

The houses passed an act for the planting of 250,000 trees, but it was of no avail, and so denuded of timber had the country become that large works started in Elizabeth's reign for the smelting of iron were obliged to be stopped at last for want of charcoal. The present century has continued the deplorable story of destruction. In forty years, from 1841 to 1881, 45,000 acres of timber were cut down and sold. Every landlord cut down, scarcely anyone planted, so that at the present day there is hardly an eightieth part of Ireland's surface under timber.

BIRDS AND REPTILES RELATED.

FOSSIL remains have been found of birds with teeth and long bony tails, and also of reptiles, with wings; great monsters they must have been—veritable flying dragons.

In 1861, in the lithographic slates of Solenhofen, Bavaria, a fossil feather was found which was the subject of considerable discussion among naturalists. Again, in 1862, a curious skeleton was disinterred from the same place, in which most of the bones exhibited the marks of a true bird, but the skeleton had a most remarkable tail, containing twenty distinct bones. From each of these bones proceeded a pair of well-developed feathers, similar to the single feather which had been previously found. Here was an animal which could be called a birdlike reptile or a lizardlike bird, with equal propriety. Its twenty caudal segments or vertebræ were a bar to its entrance to every existing family of birds, while it was equally out of place among reptiles.

FROM COL. CHI. ACAD. SCIENCES
A. W. MUMFORD, PUBLISHER, CHICAGO

SHELLS
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THE ROCK SHELLS.

FRANK COLLINS BAKER,
Curator of the Chicago Academy of Sciences.

THE rock shells or murices are among the most beautiful and interesting of all the mollusks or shell fish, and are a favorite among collectors. Their peculiar spiny shells and brilliant colors caused them to be among the first mollusks studied by naturalists and we find them, therefore, described in the earliest works on natural history.

There are about two hundred different kinds of rock shells, mostly confined to the tropical and subtropical seas, although a few are found in temperate climes. The greatest number of these are found about rocks at low water but not a few are inhabitants of waters as deep as fifty fathoms or more. In our own country they are abundant along the coast of Panama, the Gulf of California, Florida and the islands of the West Indies, but the largest number of varieties comes from the Indian Ocean, Japan, the Philippines and Australia. The more brightly colored varieties are from tropical seas, while the dull, plain species are from subtropical or temperate climes.

The murices are peculiar in having their shells ornamented by numerous projections, which vary from long, needle-like spines to simple fluted frills. What these spines and frills are for would probably puzzle the ordinary observer, as they would seem at first sight to be in the way. In some cases they are simply ornamental, but in the main they are protective and enable the animal to escape being eaten by some voracious fish. This is known as protective adaptation and was probably brought about in this manner: the murices, or their ancestors, did not at first have spiny shells, and they fell an easy prey to the fishes. As time went on a few individuals, through some modification of environment, developed small spines or prominences. The animals having these were not eaten by fishes as the knobs and spines caused the fishes pain when swallowed, therefore they preferred the animals with smoother shells. In time this modification caused a weeding-out process, the animals with smoother shells being exterminated and those with spiny shells increasing in numbers and becoming more spiny as one generation succeeded another. This continued until the present time and is going on even now.

Another interesting fact concerning the development of this ornamentation is that the smoother shells inhabit rocky shores where the waves are constantly beating in with greater or lesser violence, while the more spiny individuals live in protected and comparatively still water. This adds additional weight to the theory expressed in the last paragraph, for the fish which feed upon these shells do not, as a rule, inhabit localities where the water is rough, as along a rocky shore, but live abundantly in protected bays and lagoons in which the spiny murices are found.

There are shown on the plate eight species of rock shells, all more or less common. The first one for us to consider may be called Venus' Comb, (*Murex tribulus*) and is found in China, Japan and the Indian Ocean. It belongs to a group of shells which is characterized by a long snout or canal, and long, pointed spines. The color is yellowish; in one variety the spines are tipped with black.

A shell which is found on the mantel in every household is known as the Branched Rock Shell (*Murex ramosus*), which is widely distributed, being found in the Red Sea, the Indian Ocean, New Zealand, Australia and the Central Pacific Ocean, and attains a large size, some specimens reaching the length of a foot and weighing several pounds. The aperture is frequently tinged with a deep, beautiful

pink. In many households the large shells of this species are used for flower pots, suspended from a hook over the window by a set of chains, and for this purpose they are certainly very ornamental.

The Apple Murex (*Murex pomum*) is of home production, being found on the shores of Florida and throughout the West Indies. It is not as attractive as the shells just mentioned, but is very common, every collector possessing several specimens in his cabinet.

In the aperture of this species will be noticed a dark brown object which is known as an operculum or door, and its use is to close the aperture when the animal withdraws into its shell, so that the latter may be safe from its enemies. All of the rock shells possess this organ, which is attached to the back part of the animal's foot.

A peculiar and somewhat rare shell is the Horned Murex (*Murex axicornis*), found in the Indian Archipelago, whose shell is made up of many curiously fluted spines. The Burnt Murex (*Murex adustus*), is an inhabitant of the Indian Ocean, Japan and the Philippines, and its name, which signifies burned, is well chosen, for all its spines and frills and most of the shell are black in color and look just as though the shell had been scorched. The aperature is often beautifully tinged with pink or dark red.

A common rock shell found in the Mediterranean Sea as well as on the Atlantic coast of France and Portugal and the Canary Islands, is the Purple Murex (*Murex trunculus*). This is a light brown, three-banded shell about two inches in length and is famous as having been used by the ancients to obtain their beautiful and rich purple dye. On the Tyrian shore these shells were pounded in caldron-shaped holes in the rocks, and the animals were taken out and squeezed for the dye which they secrete. If the animal of one of our common purpuras, a small shell found along the Atlantic and Pacific coasts, be squeezed, it will exude a purple fluid which will stain fabrics a reddish purple. It is probable that much or most of the royal purple of the ancients was obtained from these lowly creatures.

Although the most beautiful shells of this family are supposed to live in the warm, tropical seas of the Indian Ocean, it is nevertheless true that many of the most brightly colored rock shells live in the warm waters of Panama and Mazatlan. The Root Murex (*Murex radix*) is one of these shells, which attains a length of five inches and weighs several pounds. The shell is white or yellowish-white and the spines and frills are jet black, the two colors producing a peculiar effect. Another beautiful shell from the same locality (Panama) is the Two-colored Murex (*Murex bicolor*), a shell attaining somewhat larger dimensions than the last. The spines are reduced to mere knobs in this species, there are but a few frills, and only two colors, the shell being greenish-white and the aperture a deep red or pink, plainly showing whence the name, bicolor, two-colored. This shell is collected by thousands at Panama and shipped all over the United States to curiosity stores at summer watering places and other vacation resorts, where they are sold at from a few cents to a dollar each, according to quality.

SPRING HAS COME.

Would you think it? Spring has come;
Winter's paid his passage home;
Packed his ice-box—gone—half way
To the Arctic pole, they say.

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. VII. MAY, 1900. No. 5

MAY.

The voice of one who goes before to make
The paths of June more beautiful, is thine,
Sweet May! Without an envy of her crown
And bridal; patient stringing emeralds
And shining rubies for the brows of birch
And maple; flinging garlands of pure white
And pink, which to their bloom add prophecy;
Gold cups o'erfilling on a thousand hills
And calling honey-bees; out of their sleep
The tiny summer harpers with bright wings
Awaking, teaching them their notes for noon—
O, May, sweet-voiced one, going thus before,
Forever June may pour her warm, red wine
Of life and passion—sweeter days are thine!

—*H. H.*

WE MAY HEAR THE BIRD SING.

NELLY HART WOODWORTH.

We may hear the bird sing but we cannot descry
The heart of the singer; the great mystery
Of the singing is hidden from sight, and the heart
Of the sweet singing bird has a vision apart;
We may listen intently to catch the sweet theme,
But who can interpret the soul of the dream?

We may hear the bird sing, catch each generous note
That pours to the air from its quivering throat,
See the breast rent with ardors; unfathomed, deep-stirred
Folded under the song lies the soul of the bird,
Unsounded and soundless, too deep for our reach
Though we listen entranced to its musical speech;
Who sees the lark's soul as it mounts from the sod,
Who sees the clear soul has a vision of God!

UNCLE NICK ON FISHING.

IRWIN RUSSELL.

It alluz sets me laughin', when I happens to be 'roun,'
To see a lot ob gemmen come a-fishin' frum de town:
Dey waits tell arter breakfus', 'fo' dey ebber makes a start,
An' den you sees 'em comin' in a little Jarsey kyart!

Now, Jarsey kyarts is springy, an,' to studdy up de seat,
De gemmen's 'bliged to ballus' hit wid suffin good to eat;
An' Jarsey kyarts is lighter run, de gemmen seems to think,
By totin' long a demijohn ob suffin good to drink.

When dy gits at de fishin' place, it's 'stonishin' indeed!
Such tricks to go a-fishin' wid *nobody* nebber seed:
Dey poles is stuck togedder wid a dozen jints ob tin,
An' has a block-an'-teeckle for to win' de fishes in!

De gemmen makes a heap o'fuss, an skeers de fishes off,
An' den dey takes an' sots de poles, some place de bank is sof,
An' den dey hunts a shady place, an' settles on de grass,
An' pruz'ntly heahs 'em: "Dat a spade? I has to pass!"

St. Petah wuz a fisherman, an' un'erstood his trade:
He sot an' watched his cork, instid ob lazin' in de shade!
De gemmen isn't copyin' arter him—dey bettah be!—
Or—*I's* a science fisherman—'t'd do to copy *me*.

When *I* goes out a-fishin', I puts on my ol'est clo'es:
(Dey age's putty tol'able, you'd nat'rally suppose!)
I gits up in de moh'nin', long afore de sun is riz,
An' grabbles wums, *I* tell you! like de yurly bird I is.

I's alluz berry 'ticlar 'bout de season ob the moon;
De dark ob hit is fishin'-time—an' time for huntin' coon;
An' den its mighty 'portant, too, as notus shed be tuk
Ob varis' little sarcumstances bearin' on de luck:

You has to spit upon de bait afore you draps it in;
Den keep yo' cork a-bobbin', des as easy as you kin;
Ef someone steps acrost de pole, you knows yo' luck is broke,
Widout dey steps it back agin afore a word is spoke.

Don't nebber, not for nuffin, think ob countin' ob yo' string;
'Kase ef you do, you ain't a-gwine to cotch anoder thing;
But ef a sarpent-doctor bug sh'd 'light upon de pole,
You knows you's good for cotchin' all de fishes in de hole.

Dah! now you has de science what a fisherman sh'd know;
So, any time yo' ready, all you has to do's to go,
An' foller dem instruckshuns—ef you does it, to de notch,
Good marster! won't it s'prise de folks to see de mess you cotch!

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MAGPIE.
⅔ Life-size.

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THE MAGPIE.

(*Pica pica hudsonica.*)

THIS is a rare winter visitor and not much known. Its nest is a very bulky and somewhat remarkable structure, composed exteriorly of sticks of various sizes, forming a spherical mass, the upper portion of which forms a canopy to the nest proper, the entrance being through one side. The eggs are usually six in number, but often as many as nine, and are of a pale olive or grayish white color, thickly speckled with olive-brown.

The magpie can be taught to talk, is intelligent and inquisitive, and has many of the characteristics of the raven.

A BUTTERFLY'S HISTORY.

(*The Troilus.*)

ELLA F. MOSBY.

THE *Troilus* belongs to the knights or chevaliers, and is a beautiful creature. His front wings are velvety black, spotted with yellow; his hind wings blue, elegantly scalloped, with a long streamer at the end, and when he lifts his wings, the under side is also lovely in marking and color. His double tongue forms a tube for sucking honey from deep flower cups, and may also be coiled up like a lasso when not used. His knobbed antennæ are supposed to be organs of scent by which he detects the perfume of blossoms or of other butterflies. For butterflies have distinct odors; the mountain silver spot smells like sandlewood, and other butterflies have the delicate fragrance of jasmine, thyme, balsam or violets. The anosia butterfly has a faint smell of honey. The sight of the butterfly, in spite of his single and compound eyes, the latter made up of many shining facets like cut gems, is not believed to be very keen. It is thought that while he perceives color in mass, he has little perception of form, and is easily deceived. The white butterflies, for instance, alight on the white-veined and spotted leaves in a garden, while seeking white blossoms. No organs of hearing have ever been discovered, and, for the most part, the movements of the butterfly are noiseless as drifting snow-flakes, the only exception being a slight click from a sudden closing of the wings, or in rapid flight.

The whole structure of the creature is for movement. He has no brain, only a cluster of nerves somewhat like one; no heart, only a segmented tube, in which a white blood circulates; no distinct lungs, but air-chambers throughout the whole body, so that it is easily poised amid the aerial waves, as he glides, or flutters securely above the earth. There are many muscles, two or three pairs of legs, and about five pairs of hooked arrangements called pro-legs; and his glory lies in his four broad wings of radiant colors, covered with silvery and shining plumes of softest texture. These wings are to him as the knight's steed, bearing him proudly in his circling combats with his rivals, or in his sportive ascents with his mate, or on his gay journeys with a crowd of winged comrades along the aerial highroads. He need not *seek* adventures, for when he is a butterfly he has already passed through wonderful experiences.

His life begins with a tiny egg, the size of a pin-head, laid singly on the *under* side of a leaf for protection. Every species of butterfly has its own special food-plants, and will feed from no others; but do not imagine that the pastures of our *Troilus* are limited. He feeds upon two of the largest and most beautiful tree families—the *Rosaceæ*

and the *Lauracea*—beautiful for fruit, flower, foliage and fragrance. With the rose family alone the range is immense, embracing, as it does, not only the rose, but the hawthorn, the meadow-sweet, the mountain ash, the strawberry, the cherry, apple and all the lovely orchard trees, while with the other family we find the glossy and shining leaf of the magnolia tribe, and the aromatic odors of sassafras and spice-wood. The butterfly eggs are marvels of color, pale green or white at first, changing to all sorts of iridescent tints as the life inside matures, and also of form, for they mimic the delicate sea-fashions of urchin and coral, the richness of oriental mosques, and the intricacy of design in Gothic windows.

Let us fancy the egg of our *Troilus* fastened—a fairy cradle, indeed—on the leaf of a wild cherry tree that has tossed its sprays of feathery white bloom, and its rustling leaves all June long in sunshine and wind and twinkling shower beneath a summer sky. When the shell is broken, what a strange thing creeps forth!—well-named a larva or *mask*, for it is a disguise that has no trace of a winged nature. The lover of the butterfly shrinks with loathing from this hideous creature, dragging itself slowly along in quest of the food which it greedily devours—the fresh, sweet leaves of the tree that has sheltered it! But unless it eats and grows there will be no butterfly, and sometimes the skin is cast off as many as five or six times, even the inner lining as well as the outside skin, to give its growth free play. If the caterpillar were large it would be terrible, for it protects itself, being soft-skinned and often helpless, by a mimicry of rage, pawing the ground, lashing its head furiously from one side to another, as a lion lashes its tail, rearing itself up menacingly in a sphinx-like attitude, grinding its mandibles with a grating sound. Its color is at first usually green like the leaf it feeds on, but it afterwards develops bright hues in some species. The *Troilus* caterpillar is green with a yellow stripe on each side, and row of blue dots, while its under side and feet are reddish. These varied colors show little, however, on the tree, for the leaves of fruit-trees, especially, quickly assume a yellow tint, and are streaked and spotted. Caterpillars protect themselves in many ways; some make a tent of a leaf near their feeding-ground, turning over an edge under which they creep, or weaving the different corners of the leaf closely together with silken threads. Even the petals of a blossom may be secured by a filmy web. If the caterpillar must spend the winter as a caterpillar, it makes of the leaf a winter-house, which it covers with wood-colored silk, and weaves the thread securely to the skin. These nests resemble closely the buds of the tree.

After the caterpillar stage of humiliation and danger, comes the strange period of sleep or seeming death, when the cocoon or chrysalid appears. The name *pupa* or babe is also used, from the likeness to an infant in swaddling bands. The caterpillar was always liable to curious fits of drowsiness or stupor; this stage of the pupa is a prolonged stupor, and it prepares for it by rolling off the garment of skin, and leaving it underfoot in the silken shroud or cell. Sometimes it sleeps in the earth, sometimes in a rock crevice, sometimes hangs like our *Troilus* looped up by a thread to a tree. The case has knobs or horns to protect the sleeper when the wind blows it against anything. It is sensitive to light, and swings towards or from it, according to need. At last comes the resurrection. From a narrow slit emerges a crumpled, wrinkled thing. If the struggles are long, dare not aid even by a touch! The butterfly is of such delicate texture that outside help means mutilation. Let it alone. Soon are the wings smoothed—I saw one hang himself up, and lengthen and lengthen, until he was about twice as long as at first—then he spreads them in flight, a glorious and joyous creature of the sunshine! He likes companions, and quickly will he find himself greeted by a Jason or splendid Ajax, or encounter a flock of his own kind, with whom he may feast by roadside puddle or beds of opening flowers.

Marvelous care is shown in the provision for the awakening from its long slumber. The threads are woven so loosely near the place of opening that they are easily broken, even in his first feebleness. The old garment, rolled in a heap at his feet, cannot impede or entangle him. He is now the *imago*—"image in full of his species,"—and, like the fairy, Ariel, he will follow summer as it flies, and swing "under the blossom that hangs on the bough"—an airy spirit of joy!

THE DEAD BIRD.

NELLY HART WOODWORTH.

Hark to the beating at the lattice!—sure
It is some winged creature asks for room
Within my walls. Shall I deny its quest,
Refuse a welcome to the homeless guest?
Who could the rigor of such night endure?
Nay, open wide the window. Come, oh, come,

And share my shelter! All the air was stirred
By the mysterious pulsing of the wings
In useless haste, until their murmurings
Grew faint and fainter; now they pulseless lay.
Again they found the light—my eyes were blurred
With tears of pity. "Here upon my breast
Thou shalt have rest. Rest thee, dear bird, I pray!"

And as the bird's throat trembles when the song
Throbbing for wings pours to the generous air,
So my heart throbbed with pity and my hand
Went quivering as I held the stranger there.

The velvet wings dropped heavy. O'er the eyes
There came a mist, like hoary mists that roll
Far up the mountain, blotting out the skies
And leaving scars upon the lonely soul;
The stars were blurred, the hilltops canopied,
The valleys lost, the little bird was dead.

THE FIELD DAISY.

JENNY T. RUPRECHT.

Nomadic queen with softly petaled face,
Thine is a beauteous throne where'er thou art,
And thine a reign triumphant from the start;
And though thy throne were in half-desert place,
Or where thou may'st behold the brooklets race,
Or just above the sleepy valley's heart,
Or higher up the grasses tall to part—
Queen of the fields! thou reign'st with witching grace.
If shine, 'tis well; if shade, thou murmur'st not,
For thou hast learned of nature patient trust—
Glad of the cloudless light all golden wrought,
Nor sad if shadows fall, as shadows must—
All these shall flee before thy floral reign,
And leave fresh charms throughout thy wide domain.

A SUBMERGED FOREST

MANY years ago, even so far back that the traditions of the oldest Siwash extend not thereto, there was some vast upheaval of mother earth on the shores of Lake Samamish that sent a portion of the big Newcastle hill sliding down into the lake, with its tall evergreen forest intact, and there it is to this day. About this time of the year the waters of the lake are at their lowest, and then the tops of the tallest of these big submerged trees are out of the water, but never more than ten or twelve inches.

Unfortunately for the curiosity seeker and traveling public generally the submerged forest is on the opposite side of the lake from the railroad and the station of Monohon, and very few people ever see the phenomenon unless they take the time and pains necessary to reach it.

Sam Coombs, the pioneer, has just been over to view the submerged forest, and he is very enthusiastic concerning its beauties and mystery. He talks Chinook fluently, but with all his quizzing of the red-skinned inhabitants he has never learned anything that will throw any light on the history of the forest under water. The waters of the lake are very deep, and the bluffs back of the beach very precipitous, so that the only explanation of the freak is that either by an earthquake or some other means a great slide has been started in early times, and it went down as a mass until it found lodgment at the bottom of the lake. At this time one can see down into the glassy, mirror-like depths of the lake for thirty feet or more. Near the banks the forest trees are interlaced at various angles and in confusion, but further out in the deep water they stand straight, erect, and limbless and barkless, 100 feet tall. They are not petrified in the sense of being turned to stone, but they are preserved and appear to have stood there for ages. They are three feet through, some of them, and so firm in texture as to be scarcely affected by a knife blade. The great slide extended for some distance, and it would now be a dangerous piece of work for a steamer to attempt passage over the tops of these tall trees. Even now the water along shore is very deep, and a ten-foot pole would sink perpendicularly out of sight ten feet from shore line.

All over this country are found strata of blue clay, which in the winter season are very treacherous, and, given the least bit of opportunity will slide away, carrying everything above with them. This is the theory of the submerged forest of Lake Samamish. It probably was growing above one of these blue earth strata, and heavy rains, or probably an earthquake, set it moving. The quantity of earth carried down was so great that the positions of the trees on the portion carried away were little affected. It is hardly to be believed that the earth suddenly sank down at this point and became a portion of the beautiful lake.

Few such places exist. There is a place in the famous Tumwater Canon, on the line of the Great Northern, near Leavenworth, which is in some respects similar. At some early time a portion of the great mountain side came rushing down and buried itself at the bottom of the canon. Now there is a considerable lake, and in the center stand tall, limbless trees, different in species from those growing along the canon.

At Green Lake, near Georgetown, Colo.—a lake which is 10,000 feet above sea level—is a submerged forest of pine trees, some hundred feet tall, but not so numerous as in Lake Samamish. This same theory explains their presence as given above.

CHICAGO COLORTYPE CO.

FROM COL. CHI. ACAD. SCIENCES.

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RED-BREASTED NUTHATCH.
⅔ Life-size.

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A. W. MUMFORD, CHIC

RED-BREASTED NUTHATCH.

(*Sitta canadensis.*)

BY LYNDS JONES.

IT IS doubtful if any bird has been more persistently overlooked or more universally confounded with a closely allied species than the subject of this sketch. His superficial resemblances to the white-breasted nuthatch, either in color or voice, are not striking, certainly not so much so as with other species which are not so confused, yet it is certainly true that but a small proportion of the laity are aware that there are two nuthatches roaming the woods, the one a migrant in the Middle and Southern States, the other resident wherever it is found. What, then, are the marked differences between them? The red-breast is decidedly smaller than his cousin, his breast is tinged with red or brown instead of the immaculate white, and there is a black line running through the eye to the back of the head, separating the white line above it from the white throat; the cry is a nasal, long drawn 'yank, yank,' very different from the brisk, crisp, business-like utterance of the white-breast. Moreover, he is a traveled gentleman who spends the winters in the South and his summers mostly north of the United States, while we have the white-breast with us during the entire year. So much for differences.

The habit of climbing head downward, sidewise, or any way, is common to all nuthatches. They feed upon the insects and their eggs and larvæ which inhabit the bark crevices, but also sometimes vault into the air in pursuit of a flying insect, after the manner of the flycatchers. In the North, where the red-breast sometimes tarries well into the winter, rarely remaining all winter long, they fasten nuts and seeds in cracks or crevices and hatch them with the beak, eating the meat, of course. It is this habit of 'hatching' nuts that gives the group its English name.

The red-breast is a bird of the whole of the United States and at least southern Canada, but can be called common only locally and occasionally. Some seasons it may not appear at all at some stations in its migration routes, and again be common for a short period, especially in the autumn. In most central localities it may be expected during the last two weeks of April and the first week of May, and again from September well into the winter months, if not all winter long.

The nest is placed in some dead stub in a hole excavated by the birds, usually several feet from the ground—as high as twelve feet sometimes. The nest material is some soft substance like fine grass and rootlets. The excavation is usually shallow, scarcely more than six inches down the stub, with other even shallower holes in other trees in the vicinity used as roosting-places for the male during incubation. In beginning the excavation, the birds drill small holes in a circle in the bark, then take out the center piece. In several instances the bark about the entrance to the nest cavity was coated with pitch in which were sticking the red-breast feathers of the architects. This pitching of the entrance to their home does not seem to be a habit common to all members of the species, however, for few collectors mention the pitch, as they certainly would if it were present.

While birds of the woods, neither the red-breast nor the white-breast are strictly confined to the woods during the seasons when they are not rearing a brood. The red-breast is frequently seen on the fences and out in the open, gleaning from weed-stalks, during his southward journey. He also seems very fond of orchards and the ornamental trees in the yard where he does excellent service for the next season's fruit and foliage. He is, perhaps, a little less inquisitive than his white-breasted cousin, but his small size and drawling voice make him a pleasant fellow to meet.

MIGRATORY BIRDS.

B. W. JONES.

"The stork in the heavens knoweth her appointed times; and the crane, and the turtle, and the swallow observe the time of their coming."—*Jer. 8: 7.*

THE migration of birds, as Baily observes, is by no means the least interesting part of their history. I have noted for many years the migrations of the birds that make a longer or shorter stay with us, summer or winter, and have tabulated their arrivals and departures. And it has been to me a labor of love. Few things cast such attraction around the young and tender spring or over brown and matured autumn, as the coming and going of migratory birds. With delight we welcome the first notes of the purple martin, the bank or sand swallow, and the chimney swift, as they return to us in spring from the far sunny southland; and with feelings of wonder we witness the flight of the wild geese, as they pass over us high in air, or listen to the notes that tell us the whippoorwill and the chuckwills-widow are again the denizens of our groves. And, night after night as I listen to their weird song, feelings almost akin to superstition creep over me, till I can imagine their utterances to be the omen of good or ill to the hearer. There is no more mysterious bird in our land than the chuckwills-widow. Its migration so far northward as southeast Virginia has been doubted by some naturalists, but facts are against them.

And as I look abroad in autumn, and view the bevies of snowbirds that have just returned to us, and hear again the familiar "chip," "chip," as a passing vehicle puts them to sudden flight, how the finger of thought touches again on memory's bell, and I think of boyhood's happy hours, when I welcomed with delight the snowbirds back again to our lanes and fields.

Each feathered songster, as it revisits us from northland or southland, awakens feeling of profoundest interest, and if we have within us a single spark of that divine love of nature that dwells with the poet or the naturalist, we instinctively receive the birds back to their old haunts as we would welcome a long-absent friend. What boy of sensibility, having a spark of the nobler touch of manhood, could have it in his heart to harm the least of these sinless creatures that enliven our homes with their presence and song? Who can look without admiration upon them? Who could wish to destroy them? And when we reflect that the martins, willets, swifts and swallows that sport about our homes in summer, and the mocking bird that trills its polyglot song in our cedar groves by night, have returned to us from tropical or sub-tropical climes—that only a few weeks before they were flitting through the orange groves of Cuba, or building their nests amid the vine-latticed thickets of Florida, we cannot but admire and wonder at that "peculiar instinct," as Howitt calls it, that guides them with such unerring certainty through all the changes of their mysterious round.

For a period of twenty years the average time of the arrival of the purple martin has been about the last five days in March; and its departure for the South the second week in August. A few individuals may remain longer, but it is only when their breeding has been delayed. The earliest appearance of the martin that I have noted was the 8th of March, 1871, the latest the 26th of April, 1885. The last date was a cold and backward spring. This bird rears two broods of four or five each during the four months that it remains with us.

The chimney swift comes a week or ten days later than the martin, and seldom begins to build before the 10th of June. It raises one brood of four to six young, usually in some unused chimney. It remains with us longer than the martin, even until the cool

nights of the last of September remind it that "the summer is over and gone." The flight of this bird is employed as a weather sign by country people. When it soars high, they say fair weather will continue, but when it flies low, then rain is near at hand.

The whippoorwill arrives, commonly, the last of March, but often not before the 10th or 15th of April. The chuckwills-widow comes three weeks later. Both of these strange birds rear one brood of two young. The nest is placed upon the bare ground, under a clump of low bushes, or a dense holly, or other low-growing tree. The eggs have the same markings as those of the bull bat, or night hawk, another very interesting migratory bird.

The catbird and the wood sparrows do not reach us till near the end of April, and often May is far advanced before these birds are noticed. The last is one of the sweetest songsters of our groves in summer, rivaling any bird of our clime. It seeks the coolest and darkest wood, where it pours forth its notes hour after hour, being one of the earliest to begin its mating lays.

The humming bird is the latest visitor to come to us in summer. This diminutive aerial voyager is one of the most charming of the migratory tribe, and worthy all the admiration that has been lavished upon it. It loves to sport in the flower gardens, where it sips the nectar from the honeycups of Flora's train. Only one species comes to us, the well-known ruby-throat.

But the young reader interested in these things should begin observation, and make a list for himself of all the migratory birds in his locality. A good form for such a record may be found in Howitt's "Book of the Seasons," an English work, but one from which a great deal about nature can be learned.

We will close our too brief sketch with the inquiry of Mrs. Kimball, of Connecticut:

"O, wise little birds, how do ye know
The way to go,
Southward and northward, to and fro?
Far up in ether piped they,
'We but obey
A voice that calleth us far away.'"

ACROSS THE WAY.

GEO. KLINGLE.

A distant line of misty hills,
A stretch of meadow low,
With wreaths of brush a-skirt the woods,
Midst fabrics spun of snow:
A vista through the the forest trees—
A temple if you choose,
With pictured screen and arabesque,
Mosaic's dusky hues,
Dim mullioned windows half confessed
Beyond far-columned aisles,
And arches lost and found anew
Through tracery's defiles;
A roof?... we might perchance ascribe
The misty, stooping sky
Beyond the wreaths of crystal
Swung where winds go singing by.
Beneath, where worshiper might tread
A glimpse of crystal tile,
Caught through the weeds and tangled reeds
Which guard the near defile.
A myriad forms a-glint and white
Close, close beneath the feet;
Fantastic hands that reach across
A myriad hands to greet;
Low shrubs in fleecy, white array,
Tall stems with hood and wings,
And vines a-glint in crystal lace
Wound through fantastic rings;
And grasses frosted into gems;
Near by a bough bent down
With such a wealth of clinging leaves
Stained deep in ruddy brown.
These and the woods' low breath of song
Just now across the way;
To-morrow?...visions change, you know,
To meet each hour of day.

THE PURPLE MARTIN.

(*Progne subis.*)

BEAUTIFUL and interesting as this bird is known to be, less has been said about it than of any of our common birds of agreeable song and manners. Its common names are house martin, purple swallow, American martin, and violet swallow. The young male is several years in attaining the uniform glossy violet-black plumage, the steel blue feathers appearing in gradually coalescing patches. It is common to the whole of temperate North America, wintering in Mexico and the Bermudas. It is only accidental in Europe. The adult female is glossy blue-black above, becoming hoary grayish on the forehead, and sometimes on the nape also. The young are similar to the adult female.

Ridgway says that no bird of America is more deserving of protection and of encouragement to live about the habitations of man than the purple martin. One pair of them will destroy more insects in a season than all the English sparrows in a township will kill in their life-time. Besides, their notes are pleasing to the ear, and their actions both when on the wing and when perching upon their boxes extremely interesting. During the breeding-season the male has a continued and varied song of great beauty and considerable power; and it is as much on account of the sweetness of their notes as for their familiarity and usefulness that these birds are such general favorites. In the wild woods where they have not had opportunity to avail themselves of man's hospitality they are as lovely and musical as when semi-domesticated in our door-yards, and, it is said, are in all respects exactly the same birds. When Audubon was traveling through the Middle States, he reported that almost every country tavern had a martin-box on the upper part of its sign-board, and commented: "I have observed that the handsomer the box, the better does the inn prove to be." The Indians hung up calabashes for the martins, so they would keep the vultures from the deerskins and venison that were drying. Mr. Nehrling says that the martin is as well satisfied with the simple hollow gourd attached to a pole near a negro hut as with the most ornamental and best arranged martin-house in the beautiful gardens and parks of rich planters and opulent merchants. He claims that where no nesting boxes are provided our martin will not breed, and that it hardly ever accepts nesting-boxes attached to trees, preferring localities where the chance is given to dart in and out uninterrupted by any obstacle.

The struggle between the martins and sparrows is so bitter that one pair of martins watched by Mr. Widmann adopted the plan of never leaving the nest alone, taking turns in going for food, because, as he explains, "it is comparatively easy to keep a sparrow out of a box, but it is impossible for a martin to dislodge him after he has built a nest."

Mr. Keyser says that in the autumn the martins assemble in flocks, sometimes large enough to suggest an ecumenical council, and fall to cackling, twittering, discussing, and in many other ways making preparation for their aerial voyage to another clime. They really seem to regret being compelled to leave their pleasant summer haunts, if one may judge from the length and fervor of their good-byes. "Perhaps they are like human beings who have a strong attachment for home, and must visit every nook and tryst to say *au revoir* before they take their departure. One can easily imagine how dear to their hearts are the scenes of their childhood, and of their nest-building and brood-rearing." After departing, they sometimes return in a day or two before they begin their southward pilgrimage in real earnest. Do they get homesick after they have gone some distance, and return once more to look upon the familiar scenes? It is one of the mysteries of bird life.

LAWRENCE
Public Library

FROM COL. CHI. ACAD. SCIENCES.

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PURPLE MARTIN.
Life-size.

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A. W. MUMFORD, CHICAGO

A GLIMPSE AT BEAUTIFUL PICTURES.

ANNE WAKELY JACKSON.

HOW many of you, I wonder, have a west window? Not one opening upon a blank wall, nor upon a vista of houses, but one from which you can see the sky. If your sky-view extends to the horizon, you are indeed blest; for then your window is no less than a frame for the most beautiful pictures—nature's own.

No landscape painter ever lived who could put upon canvas such beauty as you may see, on the majority of days, from your west window. It will only cost you a little time, and you will be richly repaid for time thus spent.

Of course finer views can be seen from a hilltop, or looking across an open plain. But one cannot often be in these places, while one might spare ten or fifteen minutes to stand by the window at sunset?

After a busy day, I know of nothing more composing to the spirit than the contemplation of some majestic form of beauty. And what could be more tranquillizing than the ever-changing beauty of a sunset?

Unless the day close enveloped in clouds, there will be some picture, well worth looking at, to be seen from your window. When a sunset is unusually gorgeous, we frequently exclaim, "That is the most beautiful one I ever saw!" But when we have watched them day after day, we will find comparisons impossible. Each one will have a special beauty of its own, quite beyond compare. Some will be more brilliant than others, but each one will be perfect in its way, and every one will have something new of beauty to reveal to us, if we look with seeing eyes.

I am particularly blessed with an open view to the west, just screened at its base by a delicate fringe of trees. The sunsets this winter have been a constant joy to me, and I long for others who love the beautiful to share this great pleasure with me.

The artistic nature, and love and appreciation of beauty, are well developed in many people whose lives are so hard and busy and full of care, that the delights of the world of art are out of their reach. It is to these particularly that I would commend the world of nature, which is more wonderful and far more beautiful than any art, and is a free gift to all.

It is an interesting study to note the different effect of the leafless trees against various backgrounds. I am one of the people who think trees are more lovely in winter than in summer. Nothing can be more exquisite, to my mind, than the tracery of bare branches and twigs against the sky.

What a study is offered by the varying lines of different trees—the limbs of some starting from the main stem in graceful curves, while others are twisted and bent at sharp angles.

During the cloudy days, I am apt to think a gray background the best that could be imagined. But next morning, perhaps, the clouds have melted away, and I find my trees wearing an entirely new expression, against the bright blue sky. Where they appeared just dark lines against the gray, they have brightened up, and taken on new and varied colors, seen against the blue; and I notice how much darker the trunks and lower limbs are, compared with the upper branches.

How different, again, they look with the sunset sky behind them! The whole western horizon, and upward for quite a space, is a blaze of orange flame! How black they look, silhouetted thus! Again, we have a pale, cold orange, or pink, fading into golden white! How clearly every twig is brought out!

How is it possible that we can pass such beauty by unnoticed, or be indifferent to it because it is common? It should be the cause of great rejoicing, that this miracle of beauty is an almost daily occurrence.

If the winter sunsets are less gor-

geous than those of summer, they are full of refinement of detail. Theirs may be a cold beauty, but it is so clear cut and perfect.

Dear reader, if you possess the frame, don't let the pictures escape you. Remember that any day not absolutely cloudy and dull, will furnish you with a masterpiece. And even after the last bright rays of the dying sunlight have faded away, glance out of the window again, as you pass, for perhaps the calm beauty of the evening star has a message for you too.

GOOSE PLANT IN BLOOM.

ALL lovers of plants and flowers should visit the greenhouse at Washington Park, Chicago, and see the goose plant. It is growing in one of the small span-roofed structures, and as seen to-day there are over a dozen goslings and three or four geese growing on one plant.

One of the biggest geese is over a yard long and broad in proportion. This plant is one of the most unique, rare and valuable known to scientists. Its correct name is *Aristolochia gigas Sturtevantii*, and it was brought here for the World's Fair. At the Fair, however, it bore only one or two flowers, as it was too young to bear more. It is a native of South America and even there is considered a marvelous product. In one of the greenhouses next to the goose house at Washington Park is a collection of caladiums of the most varied shapes and colors ever dreamed of. Mr. Kanst, the head gardener, says the collection has no duplicate. Many of the plants have leaves as delicately traced as the finest valenciennes laces. A newspaper may be read if covered with one of these transparent leaves. The colors are all shades of red, pink, maroon, crimson and yellow. The collection of water lilies is now at the best and is truly beautiful. Mr. Kanst says that the aquatic plants are as amenable to cultivation as are the terrestrial plants.

A special stage is that of the semi-apes. Probably man's ancestors among the semi-apes closely resembled the existing femurs, and, like these, led a quiet life climbing trees.

These are immediately followed by the true apes, or simians. It has long been beyond doubt that of all animals the apes are in all respects the most nearly allied to man. Just as on the one side the lowest apes approach very near to lemurs, so on the other side do the highest apes most closely resemble man.

The difference between man and the highest form of apes, the gorilla, is slighter than between the gorilla and the baboon. Below even the baboon, the oldest parent form of the whole ape group must certainly have been thickly covered with hair, and was, in fact, a tailed ape.

It is, after all, some satisfaction to know that a thousand million years may have been consumed in this evolution of man.

The heron seldom flaps his wings at a rate less than 120 to 150 times a minute. This is counting the downward strokes only, so that the bird's wings really make from 240 to 300 distinct movements a minute.

JOHNNY APPLESEED.

JOHNNY APPLESEED, by which name Jonathan Chapman was known in every log cabin from the Ohio river to the northern lakes, is an interesting character to remember. Barefooted, and with scanty clothing, he traversed the wilderness for many years, planting appleseeds in the most favorable locations. His self-sacrificing life made him a favorite with the frontier settlers—men, women, and especially children; even the savages treated him with kindness, and the rattlesnakes, it was said, hesitated to bite him. "During the war of 1812, when the frontier settlers were tortured and slaughtered by the savage allies of Great Britain, Johnny Appleseed continued his wanderings, and was never harmed by the roving bands of hostile Indians. On many occasions the impunity with which he ranged the country enabled him to give the settlers warning of approaching danger, in time to allow them to take refuge in their block-houses before the savages could attack them. An informant refers to one of these instances, when the news of Hull's surrender came like a thunderbolt upon the frontier. Large bands of Indians and British were destroying everything before them, and murdering defenseless women and children, and even the block-houses were not always a sufficient protection. At this time Johnny traveled day and night, warning the people of the impending danger. He visited every cabin and delivered this message; 'The Spirit of the Lord is upon me, and He hath anointed me to blow the trumpet in the wilderness, and sound an alarm in the forest; for behold, the tribes of the heathen are round about your doors, and a devouring flame followeth after them!' The aged man who narrated this incident said that he could feel even then the thrill that was caused by this prophetic announcement of the wild-looking herald of danger, who aroused the family on a bright moonlight midnight with his piercing cry. Refusing all offers of food, and denying himself a moment's rest, he traversed the borders day and night until he had warned every settler of the impending peril. Johnny also served as colporteur, systematically leaving with the settlers chapters of certain religious books, and calling for them afterward; and was the first to engage in the work of protecting dumb brutes. He believed it a sin to kill any creature for food. No Brahman could be more concerned for the preservation of insect life, and the only occasion on which he destroyed a venomous reptile was a source of long regret, to which he could never refer without manifesting sadness. He had selected a suitable place for planting appleseeds on a small prairie, and in order to prepare the ground, he was mowing the long grass, when he was bitten by a rattlesnake. In describing the event he sighed heavily, and said, 'Poor fellow, he only just touched me, when I, in the heat of my ungodly passion, put the heel of my scythe in him, and went away. Some time afterward I went back, and there lay the poor fellow, dead!'"

"He was a man after all." Hawthorne might have exclaimed of him, too, "his Maker's own truest image, a philanthropic man! not that steel engine of the devil's contrivance—a philanthropist!"—*A. P. Russell's Library Notes.*

Robins in the tree-tops,
Blossoms in the grass;
Green things a-growing
Everywhere you pass;
Sudden little breezes,
Showers of silver dew;
Black bough and bent twig
Budding out anew;
Pine tree and willow tree,
Fringed elm and larch,
Don't you think that May-time's
Pleasanter than March?

—*T. B. Aldrich.*

RING-NECKED DOVE.

(*Zenaidura macroura*)

THE popular names for this favorite bird are turtle dove, common dove, and Carolina dove. It is an inhabitant of all of temperate North America to a little north of the United States boundary, south through Mexico and Central America to the Isthmus of Panama, Cuba, Jamaica, and some other West Indian islands. The species have even been known to winter as far north as Canada, Mr. John J. Morley, of Windsor, Ontario, informing Professor Baird that he had seen considerable numbers near that place on the 6th of December, 1878, and that he had on other occasions seen it in various places, from three to twelve at a time. It is a common summer resident in Illinois. The majority arrive the last of March or first of April, and depart by the middle of October. In many places it becomes partly domesticated, breeding in the trees in the yard and showing but little fear when approached.

THE RING-NECKED DOVE.

All day throughout the sunny sky,
All other sounds above,
As, breathing sweet tranquillity,
Sweet voices of the dove
Have rung the oft-recurring note,
A constant vow of love.

Thus its dear mate to ever cheer,
As, still together, near they fly,
A distant echo, faint, yet clear,
Quick falling now so strangely near
When sunshine gladdens earth and sky.

But cold doth blow the dreary wind,
Or clouds arise, and float above,
With shadows darkening light of day;
No echo then from greeting love,
But, deep in quiet nest secure,
For sunshine's cheer awaits the dove.

Oh, dove! Oh, love! forever bright,
Like sunny skies your life appears,
And songs of joy your hearts delight.
If storms or shadows dark affright,
My love endures and conquers fears!

SOME EARLY RISERS.

An ornithologist, having investigated the question of at what hour in summer the commonest small birds wake and sing, says the greenfinch is the earliest riser, as it pipes as early as 1:30 in the morning, the blackcap beginning at about 2:30. It is nearly 4:00 o'clock, and the sun is well above the horizon before the first real songster appears in the person of the blackbird. He is heard a half an hour before the thrush, and the chirp of the robin begins about the same length of time before that of the wren. The house sparrow and the tomtit occupy the last place in the list. This investigation has ruined the lark's reputation for early rising. That much-celebrated bird is quite a sluggard, as it does not rise until long after the chaffinches, linnets, and a number of hedgerow birds have been up and about.

TESTING THE CLEANNESS OF THE AIR.—Professor Dewar has recently devised a new method of testing the contamination of the air. A short time ago he exhibited before the Royal institution two samples of liquid air in glass tubes —one was made from air which had been washed to purify it from dust, soot, carbonic acid and other impurities. This, when condensed, was a pale blue liquid. The other sample was made by condensing the air of the lecture-room in which the audience was assembled, and was an opaque, blackish fluid, resembling soup in appearance.

THEIR WONDERFUL EYES.—When a fly comes from an egg, one of a family of thousands, it is soft, pulpy, white, eyeless, legless. When mature it affords the student one of the most marvelous fields in all nature, with its nerve clusters and brain, its feet like the hoofs of a rhinoceros, a thousand hollow hairs on each footpad, the wings, which make 15,000 vibrations a second, and the eyes. There are 8,000 of these, each a perfect lens.

A fly's eyes are hard, immovable and retain their form after death. As a fly cannot turn its head it has eyes in all directions. So small are these eyes that 1,000,000 would not cover the surface of a square inch. Each eye measures a thousandth part of an inch and the color is amost always red.

Each of these eyes is a lens and photographs have been taken through them. The lenses are of varying kinds —some suitable for looking off at a distance, others for things close at hand. Occasionally with his thousand eyes a fly is deceived. This is evidenced when a blue-bottle inside a room heads for the open country. He does not see the window glass and the thump with which he strikes and the angry buzz which shows his discomfiture show how mistaken he was.

To prove there is nothing extraordinary in a fly's having 8,000 eyes it is known that a certain beetle owns 50,016 eyes; a certain butterfly 34,710, a common dragonfly 25,088, and a silkworm moth 12,500.

NOTES ON ANIMALS.—The insect effects its breathing, not as men and animals do, by the lungs, but through openings in all sides of the body. It has an intricate system of tubes running through all parts of its person, through which the air is brought in contact with the legs, wings, and so on. These tubes are each protected by delicate membranes. In the fly there exist certain air pouches in addition to the tubes, which serve as reservoirs of air.

It is generally supposed that instinct unerringly teaches birds and insects the best way in which to build their homes or nests, and also to provide for their offspring. The following incident, recently under personal observation, will show that instinct is not always infallible, says the *Scientific American*: "A friend placed three small empty vials in an open box on a shelf, in an upright position in close contact, and they were uncorked. A short time afterward it was a matter of surprise to find that these had been appropriated by a female mud wasp. She had placed a goodly number of spiders in the center vial, doubtless intended to serve as food for her future brood; then proceeded to deposit her eggs in those on either side. She next closed tightly the mouths of all three receptacles with a hard lime cement. Having finished her work, she then doubtless went on her way, satisfied all had been done for her offspring that a thoughtful mother could do. But just think of the sensations of those little wasps when they come into existence, for, while starving in their sealed cages, they can plainly see, through the impenetrable glass walls, the bountiful supply of food which was provided for their use.

It has been supposed that the swallow is more rapid in its flight than almost any winged creature, but the dragonfly easily outwings it. An ob-

server of insect life relates an account of a chase between a swallow and an immense dragonfly, in which the contest lasted a long time. The swallow evidently had hopes of catching the insect, but finally, after a long campaign, gave it up and let the fly escape. It has been claimed that the dragonfly was such a voracious devourer of mosquitoes that these small pests were thrown into a panic if a dragonfly approached them. It was declared that a fly confined in a room would speedily clear it of mosquitoes, but repeated experiments failed to substantiate this claim.

The dragonfly possesess the unique faculty among winged creatures, birds or insects, of flying backwards and forwards and sideways without turning its body. There are very few insects that the swallow, with its marvelous speed and dexterity, cannot catch, but the dragonfly is one them. The dragonfly without any apparent trouble, will keep a few feet ahead of a swallow for half an hour at a stretch, and no matter how swiftly the swallow flies, the dragonfly is never just there when it makes its swoop. This is because the swallow has to turn its body, while the dragonfly only reverses its wings.

The investigations of Professor Weismann have done more to solve the problem, "How death came into the world" than those of any other living man. It is generally assumed that death is associated with all forms of life, but this is not really the case. The lower forms of life, for example, may be said to have a perpetual existence, and not to be subject to death; for in unicellular reproduction life is practically endless. In the case of higher forms of life death is universal, and for a very natural reason. The aim of nature is the perpetuation of the species, not of the individual, and when creatures have, as in the case of certain insects, reproduced themselves once for all, they have no further need of existence. Creatures that nurse their young, like mammals, and produce them slowly, have need of longer life, or the species would speedily be exterminated; but there is no reason why the individual, having performed its duty in relation to the species, should continue to exist, since its existence then becomes a superfluity. Between multicellular and unicellular existence there is, therefore, the marked difference that, whereas the former dies when it has reproduced itself and so perpetuated its species, the latter goes on perpetually reproducing itself —one cell growing out of another without cessation. To Weismann we owe the knowledge of how it is that death intervenes when multicellular existence develops from unicellular. The change is effected by the differentiation of the individual—or somatic— and the reproductive cells. The former have lost the power of multiplication and reproduction, and consequently died, while the latter have preserved it.

The most curious of all objects in New Zealand is that which the Maoris call "aweto." One is uncertain whether to call it an animal or a plant. In the first stages of its existence it is simply a caterpillar about three or four inches in length, and always found in connection with the rata tree, a kind of flowering myrtle. It appears that when it reaches full growth it buries itself two or three inches under ground, where, instead of undergoing the ordinary chrysalis process, it becomes gradually transformed into a plant, which exactly fills the body, and shoots up at the neck to a height of eight or ten inches. This plant resembles in appearance a diminutive bulrush; and the two, animal and plant, are always found inseparable. One is apt to relegate it to the domain of imagination, among dragons and mermaids; but then its existence and nature have been accepted by the late Frank Buckland. How it propagates its species is a mystery. One traveler, after describing its dual nature, calmly states that it is the grub of the night butterfly. If so, then the grub must also become a butterfly, or what becomes of the species? One would be ready to suppose that the grub does really so, and that some fungus finds the cast-off

slough congenial quarters for its growth. But as far as present observation goes the grub never becomes a butterfly, but is changed in every case into a plant.

A TAME TARANTULA.—A half-breed boy of Mexican and Indian blood recently attracted much attention at Winslow, Ariz., by the performances of an educated tarantula he owns. He carries the big, formidable-looking insect in a large wooden box slung about his neck, which, when exhibiting his pet, he places on the ground as a sort of stage. At the command of its master the tarantula mounted a small ladder, rung a bell and performed on a miniature trapeze. Then to the thumping of a tambourine in the hands of the boy, it proceeded to revolve slowly about as if waltzing, and when it had finished saluted the crowd by lifting one leg three times.

After its performance was over, it crawled to its master's shoulder, where it sat, occasionally running round his neck or down into his bosom. The boy says he tamed the spider when it was young, first by feeding it every day until it grew accustomed to him, then gradually taught it the tricks it knows. He declares that it is much more intelligent than any dog, and very tractable, though uncompromising in its enmity to any one but himself. It is as large as a silver dollar when curled up, though its legs are two or three inches long.

The body is an ugly, dull brown, covered with short, coarse, black hair, which also covers the limbs, but is very sparse and bristly. The eyes are small and gleam like diamond points, while the mouth is furnished with slender, overlapping fangs. The power of spring in these creatures is said to be something incredible, a leap of ten feet being no tremendous exertion. The boy, who owns the only one which has ever made friends with any other living creature, is from the Magollon mountains.

A story is told by George W. Griffin, of Henderson county, of a shepherd dog owned by him, which certainly demonstrates the superior instinct of this little woolly creature over most species of the canine family. "One day," said that gentleman, "I was driving along the public highway, and the dog was following me. I stopped to talk to some friends that I met, and while conversing with them unknowingly dropped my watch from my vest pocket. The watch had a short piece of leather attached to it, which answered for a fob. As soon as the chat ended I got into my buggy, and drove on. I had driven half a mile or more, when, to my astonishment, I noticed the dog was trotting along close behind the vehicle with the watch hanging from his mouth by the leather strap, which he held firmly between his teeth. Of course, I made haste to stop, and get out of the buggy. As I did so the dog came up to me wagging his tail, seemingly conscious and proud of what he had done. This, though, is just one of the many intelligent acts to that little animal's credit."—*Louisville Post.*

When a dog barks at night in Japan the owner is arrested, and sentenced to work for a year for the neighbors whose slumbers may have been disturbed.

OPOSSUM.

(*Didelphys virginiana.*)

SHAW.

THE opossum is the only member of its order, the *Marsupialia*, which inhabits North America, says Mr. Chas. Hallock, one of the leading naturalists in the United States. It is confined to the southern portion, its range not reaching much north of the Ohio River on the west, or New Jersey on the east. It is probably never found east of the Hudson River.

This animal is about twenty inches long to the root of the tail, which appendage is fifteen inches in length. The color is pale grayish, the hair being nearly white with brown tips. The tail is nearly naked, and is prehensile; and the general aspect of the creature is rat-like.

"It is with a certain feeling of sadness that we chronicle the dying out, one by one, of old customs and habits. Each year old usages give place to new, and the change certainly in very many cases is not for the better.

"The opossum can hardly be classed among the game animals of America, yet its pursuit in the South in old plantation days used to afford the staple amusement for the dusky toilers of the cotton states. It was the custom in ante-bellum times, as often as the revolving year brought round the late fall days with their ripened fruit and golden grain, for the dark population of the plantation, occasionally accompanied by young 'massa,' to have a grand 'possum hunt *a la mode*. This custom, through desuetude, and change of circumstances, has been well-nigh consigned to oblivion.

"Its food, upon which it becomes fat and toothsome to the dusky palate, is persimmons and wild grapes, together with the various berries and fruits that abound in the Southern states. After the first hoar frost has whitened the hills the 'possum is most eagerly sought for by Cæsar, Pluto and Mars. At night the darkies start forth *en masse*, armed to the teeth with every available weapon, and accompanied by a number of nondescript dogs, generally well trained for 'possum or coon hunting.

"These dogs have some hound blood in their composition, and understand the requirements of the occasion perfectly. Some ancient shade of Dis with snowy hair is selected as leader, and he controls the dogs and manipulates the horn. The favorite haunts of the "varmint" are familiar to the negroes, and the "meet" is generally held on the borders of the swamp, where persimmons abound, or, if the moon shine too brightly for the game to venture far from cover, in the darker vales where the the luscious grapes run wild and plenty.

"The dogs range far from the party, and the moment one of them strikes the "trail ob an ole 'possum" he gives the signal note to the expectant party by a short yelp. This sets the sable hunters wild with excitement; they listen for the second sound, sure to come, which will betoken that the varmint is treed. They are not long kept in suspense, for faint, away down in the valley, comes the joyful bay, and at the signal the whole party stampede, spite of all 'ole uncle Cæsar's' attempts to restrain them, and rush pellmell through bush and brake in the direction of the sound. They arrive panting and breathless from the wild race, in twos and threes, and are soon all assembled at the foot of a a small sapling, in the branches of which the 'possum has taken temporary refuge from his pursuers.

"Soon a nimble young buck shins the tree, and the marsupial is shaken off after some difficulty, for he clings with the utmost tenacity to the limb, using the tail not the least in this battle for freedom. The anxious dogs below await his fall, and his death is compassed in less time than it takes to tell it. This is the only method employed in the capture of the opossum, and this is rapidly becoming traditional."

SOMETHING ABOUT DOGS.

BLENHEIM or Marlborough spaniels, which greatly resemble the latter in form and general appearance, get their English name from Blenheim Palace, in Oxfordshire, where the breed has been preserved since the beginning of the eighteenth century.

Mastiff is the term applied to a very large and powerful species of the canine family, and there is considerable conflict of opinion regarding the origin of the word. Some claim that it is derived from the Italian *mastino*, or the French *mastin*, both of which signify large-limbed.

This word, they say, was gradually corrupted into masty, a Lincolnshire expression, meaning very large, muscular, or big, until it gradually assumed its present form. Others, again, say its true origin is the old German masten, to fatten, because the mastiff is a large dog, and seems better fed than any other.

These animals were very highly prized by the early Romans, who matched them to fight in the arena with wild animals. It is related that very often two or three mastiffs defeated a lion in such combats.

Poodle is derived from the German *pudel*, a puddle or pool. This dog was originally German, and the name was probably given it because of being very closely allied to what is known as the water dog. They are without doubt the most intelligent of all canines.

The shepherd dog—called collie in Scotland, from the Gaelic *cuilan* or puppy—gains its title from the fact of its being used to watch sheep, and protect them from marauders of every description.

As to the derivation of the word bull-dog, it is only necessary to state that this species was exclusively used in bull-baiting, and from that circumstance arose the name by which it is universally known. A cross between this and the terrior is appropriately termed the bull-terrior.

The Alaskan dog is almost human in intelligence. He weighs about 100 pounds. Heavily laden, he will travel sixty miles a day, says the *St. Paul Dispatch*. With twenty dogs in a team, no two of them are in a straight line from the driver. When unhitched for the night they pile upon the first blanket that is thrown upon the snow, and there they stay. When you crawl into your sleeping bag, and pull a robe over it, the dog will get under the robe. Unless you are careful he will be inside of the bag in the morning. The animal's endurance is phenomenal, and they are capable of strong affection. They are great fighters. A traveler who recently returned from Alaska says of the treatment accorded these faithful animals: "The whip that is used on them is the cruelest thing of its kind that is known to man. Thirty feet in length, and two inches thick near the short handle, it has a lash ten feet long that cuts like a knife. The Russian knout isn't to be compared to it. When a dog is struck you hear a sharp yelp, and then your sleigh whirls past a bit of fur or possibly a piece of bloody skin lying on the snow."

Recently a little girl named Lillian could not be found. It was early in the afternoon when she was missed. There was great excitement, for it was feared the little girl had been stolen, or fallen into the river not far away. Searchers were sent in every direction, but there was no trace of the little girl even when night came. Among the most earnest searchers was Lillian's pet dog, Rover. He ran about with his nose to the ground hunting everywhere. When night came lanterns were lighted, and the people still looked for, and hoped they would find, Lillian.

Rover had come back to the house, and in some way he went down an unused stairway. At its foot was a window that opened into a small room that had not been used in a long time. Rover gave three sharp barks, and the little girl's grandfather hurried to the part of the house where the dog was.

When Rover saw him he barked more sharply, and sprang at the window, in front of which was a chair. The chair was moved, and there sat the little girl, just waked up. She had gone into this room to play house, and had fallen asleep. Rover is the hero now in that family.

EASY LESSONS IN EVOLUTION.

WITH the growing popularity of South Kensington Museum the directors and curators of its priceless collections have increased their efforts to adapt some of the accumulated store of knowledge which those collections represent to popular comprehension. The results of this activity have of late become manifest, both in the great Central Hall, and in the incomparable collection of British birds. The birds, which have been for many years a dull assemblage of specimens, all stuffed alike, and bearing an unnatural common resemblance to one another, are being rearranged in cases with a proper environment of rocks and shrub, sandhill or marsh; and with a skillful and successful attempt to display them in their habitat as they live.

The work is not nearly complete; it will hardly be so for two years to come; but already some of the cases, especially those of the solan geese, the eagles, the cormorants, and the almost vanished British bustard, are most interesting and beautiful object lessons in natural history. A lesson of a different kind is being begun in the Central Hall. During the period of Sir William Flower's directorship a number of specimens of canaries, pigeons, and domestic fowl were collected, and it was sought to show by means of these the variations which breeding might produce on a single type. Two cases of these specimens now stand in the Central Hall. On the top of the "pigeon exhibit" is the common rock pigeon. Below him, tier upon tier, are ranged the carriers, tumblers, pouters—the thirty odd breeds which fanciers have produced from the original ancestors. Many of these specimens were prize-winners in their day.

The same distinction appertains to the twenty or thirty varieties of canary, which are in an adjoining case, and which are the descendants of some ancestors whose little wings were not bright yellow at all. but a dull brownish green. The domestic fowl in the same case are intended to exhibit similar artificial peculiarities, though it should be noted that the nine-feet-long tails of the Japanese bantam are not so much the result of breeding as of eccentric cultivation, for the unfortunate bird's feathers are carefully trained in this way throughout the whole of an uncomfortable life. But the lesson in evolution which these cases seek to convey is to be carried out on a much larger scale. At the further end of the Central Hall are to be ranged a number of specimens of dogs, cows, goats, horses, cats, every species, in fact, of which mankind has produced definite breeds. Even fish, bees, silk-moths, and the greatly modified native oyster will find representation here. The nucleus of the dog collection has already been formed, and includes a mastiff of the old English breed, heads of the Irish wolf hound, Danish and French mastiffs, Russian and Mexican lap dogs, remarkable for their smallness, and Fullerton, the famous coursing greyhound. Numerous skulls, and several mummied dogs, given by Professor Flinders Petrie, will add to the interest of this collection. The authorities hope that persons who lose pure-bred or prize animals by death will present their bodies to the museum in order that they may be added to this extremely interesting display.

THE CECROPIA MOTH.

REST H. METCALF.

THE cecropia, a lepidopterous insect of the family *Bombycidia*, is the largest and most beautiful of our American moths. It is quite generally distributed throughout the United States.

The large wings, measuring from five to six inches, are covered with dusky brown scales, the borders richly variegated and beautifully marked, the anterior ones having near the tops a dark spot resembling an eye, and both pairs of wings having kidney-shaped red spots.

The caterpillar or larva is nearly as beautiful in color as the perfect moth, being about three inches long, of a light green color with coral red, yellow and blue warts with short black bristles near its head. It feeds on the leaves of nearly every species of forest fruit and shade trees, till late in August or September; then it descends from the trees to seek some shrub upon which to fasten its winter home. Occasionally they will be satisfied with a location in a tree-top, but not often.

This home building is exceedingly interesting, and although you can watch them only for a few hours you still linger near and imagine what you cannot see.

When the right location is found it spins a very strong thread for the outside, fastening it securely to a small branch, and going back and forth with this strong silk until it assumes its proper shape and proportion. You will find it almost impossible to tear it open with your fingers, and only a sharp knife will enable you to see the contents. This strong outside is necessary for protection, as the woodpeckers are very fond of the larva and imago. After this strong outside is completed the silk is woven very loosely between it and the cocoon proper. This serves as a blanket for warmth, so that the baby moth is as safe from severe winter cold and storms as a baby child in its cradle.

The inner room of this home or the cocoon proper is made of very fine silk, which can be readily reeled off, and we are told that it has been carded and spun and knit into stockings that washed like linen, and that cloth woven from this silk is much more durable than that made by the silk worm.

But for the delicate character of the larvæ, which are very difficult to raise, it would become an important article of commerce.

The inside of this cocoon is as smooth as satin and the larva after changing to the proper state is glossy black, from one and a half inches to two inches in length. As the time draws near for the great change to the beautiful moth, the pupa grows very soft and, moistening the smaller end of the cocoon with a secretion prepared for this use, comes forth with damp, small wings, which as they dry out develop into the regular size of the beautiful moth, leaving a round hole in the cocoon where both the outer and inner cocoon were woven less closely and strong than any other portion.

In New England the cecropia may be found in the month of June.

Often the larva uses a leaf in forming the outside, and after a leaf dies and is blown away the impress of the veins remains, making such a pretty cocoon. You can easily find them during the winter months, when the trees are bare, if you keep a sharp watch for them.

THE GENISTA.

PROFESSOR WILLIAM KERR HIGLEY,
Secretary of The Chicago Academy of Sciences.

The green earth sends its incense up
From every mountain-shrine,
From every flower and dewy cup
That greeteth the sunshine. —*Whittier.*

THE more one studies plant life with reference to its structure, its mode of growth, its uses and the changes which may be wrought by man to adapt it to the requirements of his taste, the more one finds it impossible to repress the words—Wonderful! Beautiful! For there is no plant so insignificant as not to have something attractive about it.

The countries adjacent to the Mediterranean Sea and the Indian Ocean produce a profusion of forms noted alike for their beauty and economic value.

In this region, with about forty-five sister species, is found the plant of our illustration. Carried from its home, it is now a common decoration of the greenhouse and private conservatory. Its sisters are of economic value. Some are used for garden hedges, some to arrest the ever drifting sands of the seashore, and some to furnish a tanning principle. Cattle browse upon some species and all contain more or less of a yellow dye called *scoparin.*

These plants belong to the pea or pulse family (*Leguminosæ*), which also includes the clovers, the peanut, the locusts, the vetches, the acacias, the bean, the lupine, the tamarind, logwood, and licorice.

It has been estimated that this family contains over four hundred and sixty genera and about seven thousand species. Here are grouped herbs, shrubs, vines, and trees, the fruit of which is a pod similar in stucture to that of the bean, and usually with irregular flowers. In this family the beasts of the field, as well as man, find some of their most valuable foods and nearly all of the species are without harmful qualies. The name of the family is derived from the Latin word *legumen*, meaning *pulse.*

The flowers of this group of plants are peculiarly adapted to cross-fertilization. Their colors, their odors, or the abundant nectar secreted by them attract numerous insects, and, while these little animals are providing for themselves Nature has also provided for the best interests of the plant, as the pollen scattered upon their bodies during their visit to a flower, is carried to another flower of like kind, thus causing a cross between the two plants, which results in a better grade of seeds.

The botanical name of the genista in the illustration is *Cytisus canariensis*, a native of the Canary Islands. The origin of the generic name, *Cytisus*, is obscure, though it is generally considered to be the ancient Greek name of the plant, and has its origin in the fact that the first species was discovered on the island of Cythrus, one of the Cyclades, a group of islands south of Greece. The specific name is derived from the name of the island where the plant is native.

The pure yellow flowers are grouped along the branches in terminal clusters. They are sweet-scented, showy and frequently so numerous as to make the plant appear like a mass of yellow blooms.

The leaves are very small, consisting of three leaflets similar in form to those of the common clove. The surface of the leaves, and of the young twigs, is covered by fine and soft hairs, causing a hoary appearance.

The plant is a shrub varying in height from a few inches to that of a man. It bears numerous and crowded branches.

Some of the other species of this interesting genus of plants bear purple or white flowers, and some obtain the stature of trees.

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WHERE VEGETABLES CAME FROM.

THE customer at a Lewiston market was in a reflective mood Saturday morning and would talk.

"How many of your customers know anything about what they eat?" said he.

"They ought to," said the blue frock, "they buy it and they order it."

"I don't mean that," was the reply. "Of course they know what they eat, but who of them know anything about the stuff? Take vegetables, for instance."

"Oh, lots of 'em know," said the market man. "Here's potatoes, for instance. They are native Americans. I guess Sir Walter Raleigh introduced them to Europe."

"I guess he never ate one, for in his time they were not considered fit to eat. They went to Europe from the hills of South America and a strange matter of fact, when you come to think of it, is that in the United States, where, barring a few sections, vegetables grow in greater abundance and beauty than any other part of the world, none save maize and the ground artichokes are native products."

"Nonsense!" ejaculated the amazed marketman.

"No nonsense about it," continued the contemplative customer. "Europe, Asia, Africa and South America are all more richly endowed than we. I used to think the watermelon was ours, but, bless you! the north African tribes grew the big, juicy fellows and gave us our first seeds. As to the muskmelon, it is a vegetable of such lineage that, like the cabbage and lettuce, nobody knows just who were their first wild progenitors. The melon, at any rate, came out of Persia as a developed table delicacy, while the Adam of the cabbage family is agreed by botanists to have flourished way back there in Central Asia, where they say the Caucasian race came from. The Romans ate cabbage salad, and, according to count, there are nearly as many varieties of this sturdy old green goods as there are different races of men.

"There is another Roman delicacy," continued the customer, pointing to a box of beets. "They do say that the Greek philosophers thought a dish of boiled beets, served up with salt and oil, a great aid to mental exercise. For my part, though, I don't know a vegetable that should be prouder of its family history than the radish. Radishes came from China, but a scientific journal the other day announced the discovery from a translation of Egyptian hieroglyphics that Pharaoh fed his pyramid builders on radishes. He even went so far as to spend 1,900 silver talents in order to regale his masons with the crisp and spicy root. Again, if you read the Old Testament carefully, you will be sure to come across the announcement that in Egypt the children of Israel ate melons, beets, onions and garlic, and, evidently, in traveling through the wilderness, Moses had a great deal of difficulty in persuading them to cease yearning after these Egyptian dainties.

"Besides the melons and peaches and geraniums," continued the garrulous customer, "for all of which we have to thank productive Persia, water cress comes from her valleys and brooks and she taught the world how to grow and head lettuce. However, the Roman gourmands, who adopted both these salads, ate green peas and string beans that their gardeners found growing in France and South Germany, and cucumbers were as popular with them as with the Jews and Egyptians.

"To Arabia honor is due for the burr artichoke. They ate it for liver difficulties—and, as a matter of fact, there is no vegetable so good for men and women who lead a sedentary life, just as carrots, that grew first in Belgium, are an admirable tonic for the complexion, spinach for the blood, potatoes for the hair, and celery for the nerves. Rhubarb, they say, was never known until the fifteenth century, when the Russians found it on the banks of the Volga, and, if you will believe it, the only European people who appreciate the eggplant as we do are the Turks. North Africa first produced

this vegetable; in France it is eaten raw often as not and in obstinate England they use it for decoration. However, the potato had to make a desperate struggle for popularity and for nearly a century, after it was imported and grown in Europe nobody could be persuaded to touch it. Finally Parmentier gave it a boom that in two centuries has not in the least diminished, and twice this little tuber has saved Europe from what promised to be a cruel famine." Whereupon the customer hurried off down the street, leaving the green-grocer staring at his stock of truck with a refreshing expression of pride and interest.

BIRDS AND FARMERS.

IF IT were customary, says a contemporary, to list such matters after the manner of stock reports, the pages of the daily papers in these days, suggestive of approaching spring, would contain two quotations something like these: "Millinery active," "Audubons aggressive."

During the cold winter months just passed, while its bird friends were in the South, the Illinois Audubon Society has been working to the end that the women who will flock to the "spring millinery openings" already heralded shall with resolute faces pass by the dainty feather-decked creations, and purchase only those which are flower-crowned or ribbon-decked. The directors of the bird protective society have issued within a day or two a pamphlet compiled by William Dutcher, treasurer of the American Ornithologists' Union. It will be sent to all the farmers' institutes, and to individual husbandmen by the hundreds, for the society believes, after having tried many means of teaching the bird-preservation lesson, that the best way to get at the milliners and the women is through the agriculturists. The more enthusiastic Audubonites declare than when the farmers read Mr. Dutcher's leaflet they will rise in mass and demand that bird killing for millinery or any other purpose be stopped. The husbandmen have a yearly crop interest of nearly three billion dollars. The total capital invested in the millinery trade is only twenty-five millions. Mr. Dutcher says that agriculture loses two hundred million every year because of the attacks of injurious insects. As the birds diminish in number, the loss increases, a fact which he declares is proved beyond a peradventure. A difference of only one per cent in the value of the farm products means a loss equal to the value of the millinery trade of the country. As a matter of fact, the farmer is the man who is paying the greater part of the millinery bills of the land.

The Audubon Society, after three years of active work, has come to the conclusion that appeals to the sympathies, and the humane feelings of men and women, are not so potent as are plain statements of facts which show how the pocketbook is touched.

FISH HAVE FAVORITE HAUNTS.

ONE strange feature of this sea life of the tropics is the regular recurrence of migratory swarms of fish of very small size that return in huge numbers year after year with such absolute regularity that the natives calculate on the event on a certain date in each year and even within an hour or two of the day, says a writer in *Lippincott's Magazine*. One such swarm of fish forms the occasion of an annual holiday and feast at Samoa. The fish is not unlike the whitebait for which the English Thames has so long been celebrated and each year it arrives in Samoa on the same day in the month of October, remains for a day, or at the most two days and then disappears entirely until the same day the following year. Why it comes, or whence, no curious naturalist has yet discovered, nor has anybody traced its onward course when it leaves the Samoan group, but the fact is unquestionable that suddenly, without notice, the still waters of the lagoon which surround each island within the fringing reef become alive with millions of fishes, passing through them for a single day and night and then disappearing for a year as though they had never come.

A visit to Samoa enabled me to see this strange phenomenon for myself and to witness the native feast by which it is celebrated year by year. I had been in Samoa for a month and in that month I had enjoyed almost a surfeit of beauty. I had coasted the shores of its islands, I had bathed in the warm, still waters of its lagoons, fringed to seaward by the white reef, on which the ocean broke in golden spray, and to landward by the silver beach of coral sand, flecked with the tremulous shadows of the swaying palms. I had climbed with my native guide the abrupt hills, covered with dense forests of tropical luxuriance, through the arcades of which I caught glimpses of the flash and luster of the ocean's myriad smiles, and again we had plunged into deep valleys among the hills, where little headlong streams murmur under the shade of the widespreading bread-fruit trees and wave the broad leaves of the great water lilies of the Pacific coast islands. This visit of the fishes came as a climax of wonders.

SILLIEST BIRD IN THE WORLD.

DODO is the Portuguese name for simpleton, and it is given to the silliest bird that ever lived.

Three hundred years ago, when the Portuguese first visited the Island of Mauritius, they found a great number of these birds. They were about the size of a large swan, blackish gray in color and having only a bunch of feathers in place of a tail, and little, useless wings. More stupid and foolish birds could not be imagined. They ran about making a silly, hissing noise like a goose, and the sailors easily knocked them over with their paddles. They couldn't fly, they couldn't swim, they couldn't run at any great speed, and as for fighting, they were the greatest cowards in the world. They were much too stupid to build a nest, and so they dropped an egg in the grass and went off and let it hatch as best it could. Added to all these things its flesh was fairly good to eat, and the Portuguese pursued it so steadily for food that in less than a century's time there wasn't a single dodo left in the world. It was quite too silly and stupid to save its own life, and so it became extinct.

THYME.

(*Thymus Serpyllum L.*)

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy.

But, if a pinching winter thou foresee,
And wouldst preserve thy famished family,
With fragrant thyme the city fumigate.
—*Virgil, Georgics,* (*Dryden*), *IV., 350.*

THE field or wild thyme (*Thymus serpyllum*) is a small, much-branched shrub, about one foot high, with rather slender quadrangular, purplish, pubescent stems. Leaves small, opposite, sessile. Flowers numerous, in clusters in the axils of the upper leaves. Corolla purplish, irregular; calyx green and persistent. The plant is propagated by means of underground stems. It is far from being a showy plant.

This plant is closely related to the garden thyme (*T. vulgaris, L.*), and grows profusely in meadows, fields and gardens. Both species are very fragrant and it is to this characteristic that they owe their popularity. The ancient Greeks and Romans valued thyme very highly and made use of it as a cosmetic, in medicine and in veterinary practice, much as it is used at the present time. Thyme yields the oil of thyme which is a valuable antiseptic, used as a gargle and mouth wash, for toothache, in dressing wounds and ulcers, also for sprains and bruises, in chronic rheumatism, etc. It finds extensive use in the preparation of perfumes and scented soaps; but its principal use is in veterinary practice. The herb is much used as a flavoring agent in soups and sauces, in fomentations, in baths and in the preparation of scented pillows.

Two kinds of oil of thyme appear upon the market, the red oil and the white oil. The latter is less aromatic being the product of redistillation. The oil is also known as oil of origanum.

Although thyme is an insignificant plant as far as appearances are concerned it has been sung by many poets. In Shakespeare's "Midsummer Night's Dream" Oberon, the king of the fairies, says to Robin Goodfellow;

"I know a bank where the wild thyme blows,
Where oxlips and the nodding violet grows,
Quite over-canopied with luscious woodbine,
With sweet musk-roses and with eglantine."

Another reference to thyme is to be found in the beautiful and pathetic story of "The Adopted Child" by Mrs. Hemans. The orphan boy in speaking to the kind lady who has adopted him, says:

"Oh! green is the turf where my brothers play
Through the long, bright hours of the summer day;
They find the red cup-moss where they climb,
Aud they chase the bee o'er the scented thyme."

DESCRIPTION OF PLATE.—*A*, plant somewhat reduced; 1, 2, leaves; 3, flower bud; 4, 5, flower; 4, 5, 6, 7, 8, different views of the flower; 9, flower without stamens; 10, stamens; 11, pollen grains; 12, 13, pistil; 14, developing fruit; 15, transverse section of fruit; 16, ripening fruit; 17, 18, 19, seed.

NOTE.—See illustration of *thyme plant* on page 171 marked digitalis through error. For description of digitalis see page 170.

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DIGITALIS.

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A CURIOUS SURVIVAL.

ELLA F. MOSBY.

THE tongue of a bird, says Mrs. Olive Thorne Miller, is the tool that shows how he gets his living, as the anvil and hammer tell of the blacksmith's work, the hod of the bricklayer's, and the chisel and plane of the carpenter's. The tongue of the woodpecker is a barbed spear, very adhesive or sticky on its surface. We know at a glance that he uses it to capture insects hiding in the crevices of the bark, and if they are too small to be speared by its sharp point, they will stick to its gluey surface. "The four-tined fork" of the little nuthatch is admirable for catching grubs out of the rough tree-trunk, and the slender tube of the humming-bird's tongue proves him a dainty taster of flower-sweets, though he, too, catches insects, with a *click* of his long, sharp bill as he flies, when flowers are rare. But there is a small bird whose tongue does not tell his own story. His tropical ancestry of many and many a year ago, like the humming-bird, sucked honey from flower-cups and juices from fruits, and so by a very curious survival of structure, this Cape May warbler that feeds on insects now has the tongue cleft at the tip and provided with a fringe like the iridescent and shining sunbird's, the honey-creeper's and flower-pecker's of southern isles. Their tongues, "pencils of delicate filaments," brush the drops of honeyed nectar from the deep tubes of tropic flowers and their sharp, needle-like bills probe the juicy fruits, though, like humming-birds, they adds mall insects to their bill of fare when necessary.

This peculiarity on the part of the Cape May is the more curious because *all* the warblers, numerous as these are and varying as widely as possible in character, plumage and habits, are alike in one respect—they are insect-eaters. Whether they are ground warblers or haunt river side and stream or explore trunk, branch, and twig-like creepers, or glean their food from the leaves, or resemble the flycatchers in habit, they live on insects, flies, ants, canker-worms, caterpillars, gnats, the larvæ and eggs of insects; nothing of this sort comes amiss to them. Some warblers seek this food in the tree-tops, and rarely descend; others feed on the ground and build their nests there. Many frequent lower boughs and shrubs, but all seek insects as their prey. A few, it is true, like the eccentric chat and the pretty gold-crowned thrush, who is *not* a thrush after all, in spite of his speckled breast, are very fond of berries. But none retain the honey-sucking habits for which the tube-like and fringed tongues, and keen, needle-like bills, were fashioned.

There is also a queer coincidence between the nest-making of the Cape May warbler and that of the flower-peckers in the Philippines Islands—another curious survival. Mr. John Whitehead, the naturalist and explorer, found a most exquisite rose-colored pouch, which looked as if formed of rose-petals, though it was in fact made of other material. The little honey-sucker had woven it together with the silken threads of a spider's web. Now, the Cape May warbler weaves his partly hanging nest of twigs and grass, and lines it with horsehair in the great fir woods of the north, but he, too, fastens it together *with spider's webbing*.

The Cape May is a rare warbler. Dr. Rives, in his list of Virginia birds, mentions it as "a rare migrant," though Dr. Fisher says it is sometimes comparatively common in the fall near Washington. It was, therefore, a charming surprise when (September, 1899,) I found the Cape Mays our most common migrants at Lynchburg, Va. From September 20 to October 18 our maple-tree was rarely without them. A great

deal of noisy work was going on close by, as the street was being widened and newly paved, but these "tiny scraps of valor," as Emerson calls his friends, the chickadees, showed no timidity or distrust. The colors of the different birds varied widely. One could hardly believe that the adult male Cape May with his striking white on rich olive above, and his tiger-like streaks of glossy black on shining yellow below, his dark cap and chestnut-red ear-patches, belonged to the same family as the immature female. *She* is plain grayish olive above, and has a streaked grayish breast, as sober as a Quaker, save for her yellow rump. The Cape May, the prairie, the myrtle and the magnolia warblers are the four yellow-rumped species—a most convenient mark of distinction.

In character our little visitor showed energy and courage, usually driving off any new-comer, even of his own family, from his feeding-ground. He journeys in mixed crowds, but prefers a table to himself. He even won respect from English sparrows by his pugnacious traits. They generally let him alone, though they attacked the other strangers unmercifully. He explored his tree thoroughly, and with great agility, often spending hours in traveling from bough to bough, twig to twig, up and down our maple, and especially examining the underside of all the leaves within reach. Sometimes on tiptoe he stretched his pretty head to its farthest extent to investigate a dangling leaf above him; sometimes he hung, head downward, to clean the eggs and larvæ from a leaf below. I have seen him dextrously somersault to a lower bough, or hold on to a slender twig, scolding and pecking alternately, as the wind-tossed him to and fro. Occasionally he sang a little song, rather thin and monotonous, but not unpleasing. It has been compared to the song of the Nashville warbler, and also to that of the black and white creeper.

The cause of his long stay was no doubt the abundance of insects during our warm fall. Swarms of gauzy-winged insects were seen everywhere, wheeling in airy circles in the sun, and sometimes covering the wraps and hats of pedestrians. There were crowds of birds in our parks. One sunny afternoon I watched with interest the likeness between a wood pewee, catching insects in the air, and a flock of Cape May warblers engaged in the same pursuit. But there was a difference; the warbler darted straight out from his magnolia tree, caught his gnat and returned, whether to the same bough I could not see for the leaves were so thick, but probably only near by. The true flycatcher fluttered in an aerial circle, returning to precisely the same perch after capturing his insect.

The tiny fringed and cleft tongues seemed useless in this occupation, but like some parts of the human body for which we have not yet ascertained the present use, they may be invaluable as records of past history under different conditions from those of to-day.

"Look at Nature. She never wearies of saying over her floral pater noster. In the crevices of Cyclopean walls—on the mounds that bury huge cities—in the dust where men lie, dust also—still that sweet prayer and benediction. The 'Amen!' of Nature is always a flower."—*Autocrat.*

The gorse is yellow on the heath,
The banks with speedwell flowers are gay,
The oaks are budding; and beneath
The hawthorn soon will bear the wreath,
The silver wreath of May.
—*Charlotte Smith.*

THE RAVEN.

(*Corvus Corax.*)

THIS handsome and truly interesting bird is found in nearly all portions of the globe wherever there are wide expanses of uncultivated ground. It is a solitary bird, living in the wildest places it can find, especially preferring those that are intersected with hills. In such localities it is said the raven reigns supreme, "scarcely the eagle himself daring to contest the supremacy with so powerful, crafty, and strong-beaked a bird."

The raven lives almost entirely on food of an animal nature, and there are few living things which it will not eat when the opportunity is given it. Worms, grubs, caterpillars, and insects of all kinds are swallowed by hundreds, though carrion is its chief diet. Its wings are large and powerful, and its daily range of flight is so extensive that many hundreds of objects pass under its ken, and it is tolerably sure, in the course of the day, to find at least one dead sheep or lamb. So strongly is the desire for attacking wounded or dying animals implanted in the breast of the raven, that, according to Mudie, the best method of attracting one of these birds within gunshot is to lie on the back on some exposed part of a hill with the gun concealed and close at hand. It is needful to remain perfectly quiet, because if there is the slightest sign of life the raven will not approach, for, as Mudie rather quaintly observes, "he is shy of man and of all large animals in nature; because, though glad to find others carrion, or to make carrion of them if he can do it with impunity, he takes good care that none shall make carrion of him." It is needful to watch carefully, and not to be overcome by sleep, as the first intimation of the raven's approach would to a certainty be the loss of an eye.

The tongue of the raven is rather curiously formed, being broad, flat, covered with a horny kind of shield, and deeply cleft at the extremity. At the root are four rather large projections or spines, the points being directed backward. The use of the spines is not known.

The cunning of the raven is proverbial, and many anecdotes are told of its intellectual powers. Charles Dickens in "Barnaby Rudge" has made of it an interesting character, which is by no means overdrawn. From the mass of these stories we will select one which is not generally known:

"One of these birds struck up a great friendship for a terrier belonging to the landlord of an inn, and carried his friendship so far as to accompany his ally in little hunting-expeditions. In these affairs the two comrades used to kill an astonishing number of hares, rabbits, and other game, each taking his own share of the work. As soon as they came to a covert, the raven would station himself outside, while the dog would enter the covert and drive out the hares from their concealment, taking care to send them in the direction of the watchful bird. On his part the raven always posted himself close to one of the outlets, and as soon as any living creature passed within reach, he would pounce upon it, and either destroy it at once or wait until the dog came to his assistance, when by their united efforts the prey was soon killed. Rat-hunting was a favorite sport of these strange allies, and it was said by those who witnessed their proceedings that the raven was even more useful than a ferret would have been."

Captain McClure, the Arctic voyager, says that the raven is the hardiest of the feathered tribe, and even in the depths of winter, when wine freezes within a yard of the fire, the bird may be seen winging his way through the icy atmosphere, and uttering his strange, rough, croaking cry, as unconcernedly as if the weather were soft and warm as springtime.

In captivity the raven is an exceedingly amusing, although mischievous creature, and displays a talent for the invention of mischief which is only

equaled by its rapidity of execution. Except when placed in an inclosed yard where there is nothing that is capable of damage, "a single raven will get through more mischief in one hour than a posse of boys in twelve, and as he always seems to imagine himself engaged in the performance of some extremely exemplary duty, and works his wicked will as methodically as if he had been regularly trained to the task, and very well paid for it, he excites no small amount of rage on the part of the aggrieved person." He readily learns to speak, and retains many sounds which he has once learned.

The raven is nowhere abundant in Illinois. According to Mr. Nelson, it was formerly a not uncommon resident in the northeastern portion of the state, but now occurs only in winter and is rare. It frequents the sand hills along the lake shore from the last of October until spring. In winter they unite in small flocks and move from place to place.

WILD FLOWERS OF MAY.

PRESIDENT MARSH, in his report to the commissioners of Forest Park, Springfield, Mass., for 1899, mentions the following wild flowers as in bloom in the park during the month of May. We avoid the use of the botanical names:

WHITE BLOOM.

Star flower. Canada Mayflower. Shepherd's purse. White violet. Solomon's seal. False Solomon's seal. Bellwort. White baneberry. Wild strawberry.

YELLOW BLOOM.

Yellow violet. Common cinquefoil. Golden cup. Dandelion. Watercress.

PINK BLOOM.

Twisted stalk. Wild pink.

ORANGE AND RED BLOOM.

Lousewort.

BLUE AND PURPLE BLOOM.

Blue violet. Forget-me-not. Wild geranium. Ground ivy.

MISCELLANEOUS.

Jack-in-the-pulpit. Wild ginger. Wild pink azalea. Japanese hybrids. American rosemary. Parkman's crab. Flowering apple. Thunberg's barberry. Ashberry. Japan ashberry. Bayberry. Leatherleaf. American Judas tree. Golden chain. Japan weeping cherry. Siebold's double red flowering cherry. Weeping wild cherry. Choke cherry. Wild plum. Sweet fern. Flowering dogwood Red flowering dogwood. Weeping dogwood. Red osier dogwood. Siberian red osier. Sheep berry. Cranberry tree. Naked viburnum. English wayfarer's tree. Common snowball. White thorn. Pear-leaved thorn. English hawthorn. Japan quince. Chinese lilac. Flowering peach. Buffalo berry. Wild rose. Sweet brier rose. Weeping willow. Bridal wreath. Tree peony. Flowering almond. Shrub yellow root. Wild red raspberry. Thimble berry, or black raspberry. Huckleberry. Blueberry. Common high blackberry.

In the June number of BIRDS AND ALL NATURE we shall give the flower shrubs which bloom in that month. The annual report of the commissioners of parks at Springfield is a worthy example for others to follow.

RICE PAPER.

THE rice paper tree, one of the most interesting of the flora of China, has recently been successfully experimented with in Florida, ere it now flourishes, with other subpical and oriental species of trees d shrubs, says the *St. Louis Republic*. hen first transplanted in American l the experimenters expressed ubts of its hardiness, fearing that it uld be unable to stand the winters. l these fears have vanished, hower, and it is now the universal opinn that it is as well adapted to the cliate of this country as to that of the ned Flowery Kingdom.

It is a small tree, growing to a height less than fifteen feet, with a trunk stem from three to five inches in dieter. Its canes, which vary in color cording to season, are large, soft and wny, the form somewhat resembling at noticed in those of the castor-bean plant. The celebrated rice paper, the product of this queer tree, is formed of thin slices of the pith, which is taken from the body of the tree in beautiful cylinders several inches in length.

The Chinese workmen apply the blade of a sharp, straight knife to these cylinders, and, turning them round either by rude machinery or by hand, dexterously pare the pith from circumference to center. This operation makes a roll of extra-quality paper, the scroll being of equal thickness throughout. After a cylinder has thus been pared it is unrolled, and weights are placed upon it until the surface is rendered uniformly smooth throughout its entire length.

It is altogether probable that if rice paper making becomes an industry in the United States these primitive modes will all be done away with.

GOOD UNCLE TO ANTS.

A KINDLY old English gentleman, Sir John Lubbock, Bart., is no more. He is not dead, but has sed to be a plain baronet, as were father, grandfather, and great-andfather before him. Now he is a er of the realm, and he is called Lord vebury. The new honor, lately con-red by the Queen, Sir John probawes to his great services in Parlia-for he is not only the owner of a nk in London, and a dis-ed financier, but also a repre-e in the English Parliament of the University of London. In both fields his work for his fellow men has been such as to merit well an honor which all Englishmen are supposed to desire.

But we in America shall always remember him not as Lord Avebury, but as plain Sir John Lubbock, a man who probably knows more than any other in the world about the habits, nature and instincts of insects, especially of ants, bees and wasps, of which he has written more than one interesting book.

Fair- rld needs for its happir the rk, more achievement. shing- s never at rest, sets a eeder , not only of unceasing ive on f exquisite workmanepth a beetle crawls along has a burnished back led green; not a weed goes to seed but hides its promise of next year's blossom in a pod of fairy delicacy; not a spider-web glitters in the sun that is not marvelous in its structure. If only the world could be more conscious of "the Master of all good workmen" there would be less heartache than there is.

"Some little nook or sunny bower,
God gives to every little flower."

A FLOATING SNAIL.

THERE is a small snail which is so fond of the sea that it never comes to land, and it builds such a capital boat for itself and its eggs that while large ships are sinking and steamers are unable to face the storm it tosses about in perfect safety, says the Philadelphia *Press*.

The little snail is of a violet color and is therefore called Ianthina. It has a small shell and there projects from the under part of the body a long, tongue-like piece of flesh. This is the raft, and it is built upon most scientific principles, for it has compartments in it for air. It is broad and the air compartments are underneath, so that it cannot capsize.

Moreover, the snail knows how to stow away its cargo, for the oldest eggs and those which hatch the soonest are placed in the center and the lightest and newest on the sides of the raft. The Ianthina fills its own air compartments by getting a globule of air underneath its head, the body is then curved downward beneath the raft, and, the head being tilted on one side, the air rushes in and fills the spaces. It feeds on a beautiful little jelly fish, which has a flat, raft-like form with a pretty little sail upon it, and they congregate in multitudes when the sea is calm.

Sometimes specimens are washed upon the northwestern coast of France, and when they are handled they give out a violet dye.

EGYPTIAN TREES FOR AMERICA.

HERE is a new kind of tree with which people in some of the parts United States will probably celebrate Arbor Day after a while. In Southern California, Arizona and some parts of Texas, and, generally speaking, in the southwestern portion of this country, are great tracts of land without a solitary tree. The government has at last found a tree which it is believed will grow and thrive in these warm, dry climates, and has imported seeds and settings with which to make experiments. It is called the lebbek tree and is a native of Egypt. It grows to a large size and has a thick foliage, with compound leaves like those of the honey locust. The bark makes good dye stuff and the wood is fair timber. One of the avenues leading to the great Pyramids is lined with these trees for a distance of four miles. They form a complete arch and the shade is so dense that no sun ever reaches the roadway beneath. In India these trees are called the Siris trees. They grow wild in the forest and their trunks attain a circumference of nine feet.

Their adaptability to the dry section of the United states was discovered and reported upon by David Grandchild, one of the explorers for the agricultural department at Washington. The lebbek tree is a deep rooter and therefore is expected to thrive where the moist subsoil found at great depth even in the American desert.

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